POSEIDON-Berichte

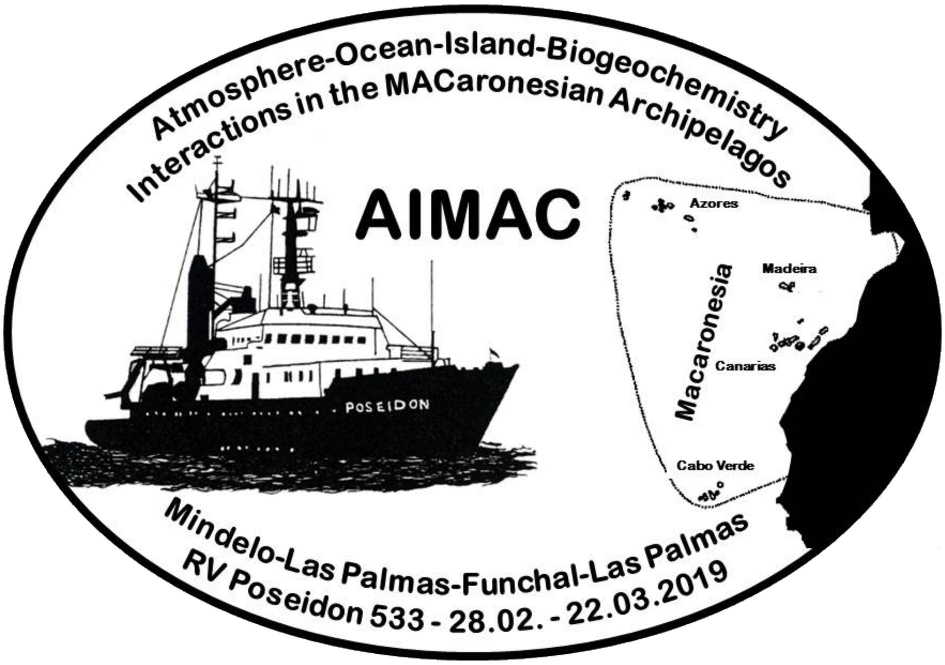
Atmosphere-Ocean-Islands-Biogeochemical interactions in the Macaronesian Archipelagos of Cabo Verde, the Canaries and Madeira

POS533

28. February 2019- 22. March 2019

Mindelo (Cabo Verdes) – Las Palmas (Spain)

AIMAC



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2019

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1. Cruise Summary

1.1Summary in English

Poseidon 533 – AIMAC (Atmosphere–ocean–island-biogeochemical interactions in the Macaronesian Archipelagos) investigated the influence of the Cape Verdes, the Canary Islands, and Madeira on the physics, chemistry and biology of the surrounding subtropical North- East Atlantic ocean. The air – sea exchange of halocarbons from marine sources impact tropospheric and stratospheric chemistry, and therewith air quality and human health. High oceanic and atmospheric concentrations of iodinated, brominated and chlorinated methanes are often found near coastlines. In particular, bromoform ($CHBr_3$) was recently detected at unexpectedly high concentrations in seawater of subtropical coasts, e.g. at Miami and Tenerife beaches. Bromoform is produced naturally from macro algae and phytoplankton and is the major marine vector of organic bromine to the atmosphere. Together with dibromomethane (CH_2Br_2), it is the main contributor to natural stratospheric bromine, involved in ozone depletion. Bromoform is also a major product during disinfection of seawater for many industrial and recreational purposes and during desalination processes. While the bromoform production from phytoplankton generally leads to picomolar concentrations in seawater, macroalgal production yields nanomolar concentrations and disinfection processes involving seawater can increase concentrations to micromolar levels. The latter has led to the occasional application of this compound as tracer for the effluents of power plants and wastewater discharges. Other disinfection by-products (DBP) in the effluents can lead to unfavorable effects on the environment and human health. As bromoform shows large concentrations in urbanized and industrialized regions, the elevated concentrations at many coasts may have a major and increasing contribution to the global budget.. We hypothesize, that populated coastlines show elevated bromoform concentrations from disinfection activities, related to the amount of population and industrial activities. Coastal alongshore currents may additionally trap the compound inshore. Therefore, bromoform can be a good tracer of the terrestrial and anthropogenic signal in the island mass effect, which describes the increase in nutrients and biological productivity in the surrounding water masses of an island. POS533 investigated the bromoform distribution in ocean and atmosphere in the subtropical East Atlantic and the islands of Madeira, Tenerife, Gran Canaria and the Cape Verde Archipelago, considering physical and biogeochemical parameters, phytoplankton distribution and carbon chemistry. During the cruise new scientific tools where applied, to differentiate between the islands natural and anthropogenic interactions with ocean and atmosphere. The measurements deliver the first comprehensive biogeochemical data set of phytoplankton, microbiology, trace gases, carbon, oxygen and nutrient cycling from this region close the islands in exchange with the open ocean. Despite the novel knowledge, current climate chemistry and chemical transport models used to understand the anthropogenic signal of marine halocarbon emissions and their effects on tropospheric oxidation and stratospheric ozone will benefit from the expedition's dataset.

1.2 Zusammenfassung

Poseidon 533 - AIMAC (Atmosphere-Ocean-Island-Biogeochemical Interactions in the Macaronesian Archipelagos) untersuchte den Einfluss der Kapverden, der Kanarischen Inseln und Madeiras auf die Physik, Chemie und Biologie des umgebenden subtropischen Nordostatlantiks. Der Luft-Meeraustausch von Halogenkohlenwasserstoffen aus marinen Quellen wirkt sich auf die Chemie der Troposphäre und der Stratosphäre und damit auf die Luftqualität und die menschliche Gesundheit aus. Hohe ozeanische und atmosphärische Konzentrationen von Iod-, Brom- und Chlormethanen sind häufig in der Nähe der Küsten zu finden. Insbesondere Bromoform ($CHBr_3$) wurde kürzlich in unerwartet hohen Konzentrationen im Meerwasser subtropischer Küsten nachgewiesen, zum Beispiel in Miami und Teneriffa. Bromoform wird auf natürliche Weise von Makroalgen und Phytoplankton produziert und ist der Hauptträger von organischem Brom in die Atmosphäre. Zusammen mit Dibrommethan (CH_2Br_2) trägt es hauptsächlich zum natürlichen Brom in der Stratosphäre bei, das am Ozonabbau beteiligt ist. Bromoform ist auch ein Hauptprodukt bei der Desinfektion von Meerwasser

für viele Industrie- und Erholungszwecke und bei Entsalzungsprozessen. Während die Bromoformproduktion aus Phytoplankton im Allgemeinen zu picomolaren Konzentrationen im Meerwasser führt, führt die Makroalgenproduktion zu nanomolaren Konzentrationen, und Desinfektionsprozesse mit Meerwasser können die Konzentrationen auf mikromolare Werte erhöhen. Letzteres hat dazu geführt, dass diese Verbindung gelegentlich als Tracer für die Abwässer von Kraftwerken und Abwassereinleitungen eingesetzt wird. Andere Desinfektionsnebenprodukte (DBP) in den Abwässern können zu nachteiligen Auswirkungen auf die Umwelt und die menschliche Gesundheit führen. Da Bromoform in urbanisierten und industrialisierten Regionen hohe Konzentrationen aufweist, können die erhöhten Konzentrationen an vielen Küsten einen erheblichen und zunehmenden Beitrag zum globalen Budget leisten. Wir nehmen an, dass besiedelte Küsten im Verhältnis zur Bevölkerungszahl erhöhte Bromoformkonzentrationen aufgrund von Desinfektionsaktivitäten aufweisen und industrielle Aktivitäten. Küstenströmungen können die Verbindungen entlang der Küsten konzentrieren. Daher könnte Bromoform ein guter Indikator für das terrestrische und anthropogene Signal im Inselmasseneffekt sein, der die Zunahme von Nährstoffen und die biologische Produktivität in den umgebenden Wassermassen einer Insel beschreibt. POS533 untersuchte die Bromoformverteilung im Ozean und in der Atmosphäre im subtropischen Ostatlantik und auf den Inseln Madeira, Teneriffa, Gran Canaria und den Kapverden unter Berücksichtigung physikalischer und biogeochemischer Parameter, der Phytoplanktonverteilung und der Kohlenstoffchemie. Während der Expedition wurden neue wissenschaftliche Methoden genutzt, um die natürlichen und anthropogenen Wechselwirkungen der Inseln mit dem Ozean und der Atmosphäre zu unterscheiden. Die Messungen liefern den ersten umfassenden biogeochemischen Datensatz von Phytoplankton, Mikrobiologie, Spurengasen, Kohlenstoff, Sauerstoff und Nährstoffkreisläufen aus dieser Region, die die Inseln mit dem offenen Ozean austauschen. Aktuelle Klimachemie- und Chemietransport-modelle, die zum Verständnis des anthropogenen Signals mariner Halogenkohlenwasserstoffemissionen und ihrer Auswirkungen auf die troposphärische Oxidation und das stratosphärische Ozon eingesetzt werden, werden von dem Datensatz der Expedition profitieren.

2 Participants

2.1 Principal Investigators

Name		Institution
Dr. Quack, Birgit	Chief scientist/ Biogeochemistry	GEOMAR, Germany
Prof. Dr. Caldeira, Rui	Principal investigator/ Oceanography	ARDITI/OOM, Madeira

2.2 Scientific Party

1. Dr. Helmke Hepach, Scientist (GC/MS of Halocarbons in sea water),
2. Jesus Leonel drase a Costa dos Reis, PhD (Weather balloon, Marine Boundary Layer Height, Ocean currents), disembarked in Las Palmas on 14.03.
3. Cláudio Roberto Fernandes de Góis Cardoso, PhD (Ocean eddies, oceanography)
4. Prof. Dr. Manfred Josef Kaufmann, Scientist (Phytoplankton sampling)
5. Teresa Lopes Silva, PhD (Phytoplankton sampling)
6. Prof. Dr. Magdalena Santana- Casiano, Scientist (Iron chemistry in seawater)
7. Prof. Dr. Melchor González-Dávila, Scientist (Carbon chemistry, oxygen in seawater)
8. Prof. Dr. Corrine do Rosário Timas Almeida, Scientist (Marine biology), disembarked in Las Palmas on 14.03.
9. Melina Renate Mehlmann (GC/MS of Halocarbons in seawater), Master student, disembarked in Las Palmas on 14.03.
10. Dr. Dennis Booge, Scientist (GC/MS of DMS and Isoprene in seawater)
11. Franziska Diercks, student (Air sampling of canisters for trace gas analysis), embarked in Las Palmas on 14.03.
12. Cátia Alexandra Cardoso Azevedo, PhD (CTD, Oceanography), embarked in Las Palmas on 14.03.
13. Ricardo Jorge Agrela Faria, technician (CTD, Oceanography), embarked in Las Palmas on 14.03.

2.3 Participating Institutions

1. GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel (PIs: Birgit Quack, Halocarbons; Anja Engel, Organic carbon; Christa Marandino, DMS; Hermann Bange; Nitrous Oxide, Methane, Arne Körtzinger, Surface Oxygen, Gastension; Jens Greinert. Methane, CO_2, Water Vapour, in Marine Atmospheric Boundary Layer)
2. University of Las Palmas de Gran Canaria (PIs: Melchor Gonzalez Davila, Carbonate Chemistry, Oxygen; Magdalena Santana Casiano, Iron Chemistry)
3. University of Madeira/OOM (Manfred Kaufmann, Phytoplankton)
4. Agência Regional para o Desenvolvimento da Investigação Tecnologia e Inovação (ARDITI)/ Observatório Oceânico da Madeira (OOM) (PIs: Rui Caldeira, Physical Oceanograph)
5. University of Cape Verde, Praia (PI: Corinne Almeida, Biological Oceanography)
6. University of Evora, Portugal (PI: Rui Salgado, Marine Meteorology)
7. RSMAS, Miami,US (PI: Elliot Atlas, Atmospheric Chemistry)
8. Syddansk Universitet, DK (PI: Carolin Löscher, Microbial Diversity)
9. University Marseille, F (PI: Jean-Luc Boudenne, Disinfection Byproducts)

2.4 Crew of POS 533, AIMAC

	RV Poseidon POS 533	**DBKV**	**Mindelo**	**28.02.2019**
	Family name; given names	Rank or rating	Nationality	
1	Günther, Matthias	Master	German	
2	Thürsam, Dirk	Chief Officer	German	
3	von Keller, Magnus	2nd Officer	German	
4	Pieper, Carsten	Chief Engineer	German	
5	Rusik, Michael	2nd Engineer	German	
6	Neitzel, Gerd	Electrician	German	
7	Langhans, Julian	Motorman	German	
8	Mischker, Joachim	Bosun	German	
9	Heßelmann, Dirk	SM	German	
10	Kuhn, Ronald	AB	German	
11	Maas, Matthias	SM	German	
12	Argetoianu, Ionut-Georgel	SM	Romanian	
13	Wolff, Thomas	Cook	German	
14	Gerischewksi, Bernd	Steward	German	

3 Research Program

The cruise of POS533 started on 28.th of February in Mindelo, on Sao Vicente, Cape Verdes, crossed nearby Santo Anta, Sao Nicolau, Fogo, Santiago, Boavista and Sal. After five days of transit against the northeastern trade winds, POS533 transected through the coastal waters of Hierro, Gomera, Tenerife, and Gran Canaria. Three crewmembers changed in Las Palmas. The ship then went up to the Salvages, and after two transits in lee of Madeira, samples and crew were dropped of in Funchal and a day later the cruise POS533 ended in Las Palmas on the 22nd of March 2019.

3.1 Description of the Work Area

The area of the subtropical Macaronesioan islands is dominated by northeastern trade winds from north- western Africa, which in spring transport dust events from the Sahara over the region, while in summer, which was the original planned time of the cruise, more northerly steady trade winds under a stable trade wind inversion occur. The overlying trade wind inversion is one of the most prominent temperature inversions within the troposphere and limits clouds and turbulent mixing to below a height slightly above inversion base. It is generally stronger during daytime and summer.

Atmospheric conditions

The trade winds interaction with the islands develops strong turbulent effects in the lower layers of the atmosphere which feedbacks to the ocean surface (Baldasano et al. 2017; Grubisic et al., 2015; Pullen et al., 2017). Conversely, ocean features generated by islands, such as mesoscale eddies, filaments and warm wakes generally generate distinct SST signatures (Sangra et al., 2007), which in turn feedback to the overlying atmosphere (Xie et al., 2001). Around the islands, cooler water masses and warm marine mesoscale anomalies have been observed to create thermal inversions in concert with the synoptic conditions. These interactions entail boundary layers between 300 to 1500 m height over the timescale of days (Baldasano et al., 2017, Pullen et al., 2017, Carpenter et al., 2010) interacting with the trade inversion. This will have a significant influence on the boundary layer concentrations of trace gases emitted in the coastal ocean and on their air- sea exchange.

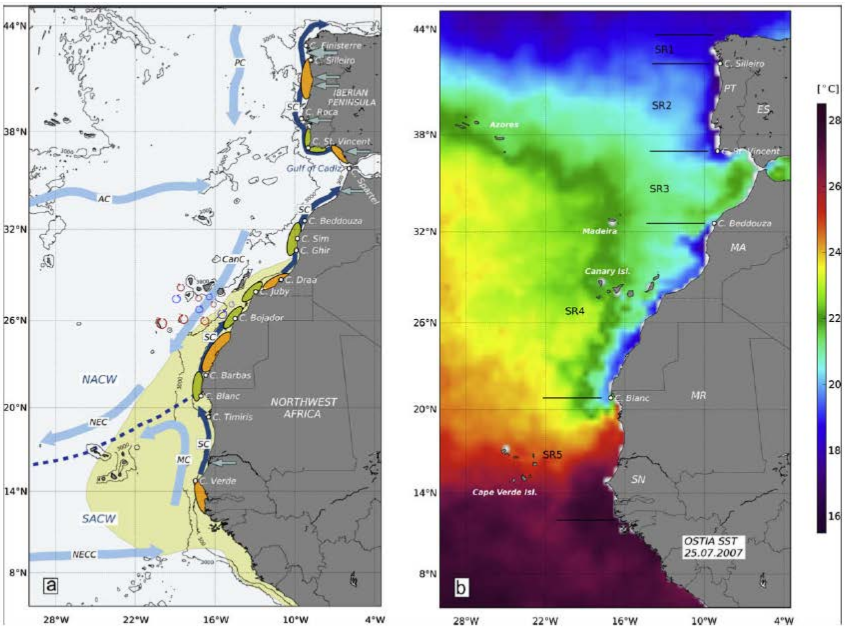


Figure 3.1: (a) Canary Basin with main currents (light blue: surface currents; dark blue: slope current), major capes, freshwater (blue arrows), dust inputs (>10g m-2yr-1) shaded yellow), retention (orange) and dispersion (green) zones on the shelf, frontal zone between water masses (dashed blue lines) and mesoscale eddies (blue: cyclones; red: anticyclones) south of the Canary Islands. NACW: North Atlantic Central Water; SACW: South Atlantic Central Water; AC: Azores Current; CanC: Canary Current; MC: Mauritanian Current; NEC: North equatorial Current; NECC: North equatorial Countercurrent; PC: Portuguese Current; SC: Slope Current. (b) Map of sea-surface temperature over the study area on 25 July 2007 from OSTIA (Stark et al., 2007).(Aristegui et al., 2009)

Oceanography

The surface and upper-thermocline waters of the region are characterized by strong coupling through intense mesoscale variability between the coastal Canary Current and Mauritanian upwelling region and the open ocean, especially south of the Canary Archipelago (Figure 1). The frequent occurrence of cyclonic and anticyclonic eddies in the region and leeward of the islands together with upwelling filaments play an important role in the lateral mixing and transport of physical and biogeochemical properties and thereby modulate biogeochemistry and biological productivity. Warm wakes are omnipresent during summer months leeward of subtropical islands, such as Madeira (Caldeira et al., 2014). While cyclonic eddy circulation pumps deep water into the euphotic zone and enhances phytoplankton primary production, anticyclonic eddies on the other hand, promote downwelling, deepening the mixed layer and sinking warmer oligotrophic surface water in their cores. South of the Canaries both anticyclonic and cyclonic eddies show imprints on the biogeochemical cycling of carbon (Gonzalez-Davila et al. 2006, Barton et al., 2004, Aristegui et al., 2009, Sangrà et al. 2009, Baltar et al., 2010, Caldeira et al., 2014).

The general circulation pattern in the subtropical North East Atlantic includes the eastward flowing Azores Current (AC) in the North and the southward directed North Equatorial Current (NEC) along the western coast of North West Africa in the East. At around 15◦W the Canary Current branches off the AC with a southward-directed flow, which turns to southwest between 30◦N and 25◦N. All surface currents carry central water masses. At intermediate depths, Antarctic Intermediate Waters (AAIW) flows north along the West African coast (see Figure 3). In the North very salty seawater Mediterranean Water (MW) enters the Atlantic basin at intermediate depth. A deep-water mass in the subtropical North East Atlantic is North Atlantic Deep Water (NADW) containing another salinity maximum [Emery, 2003].

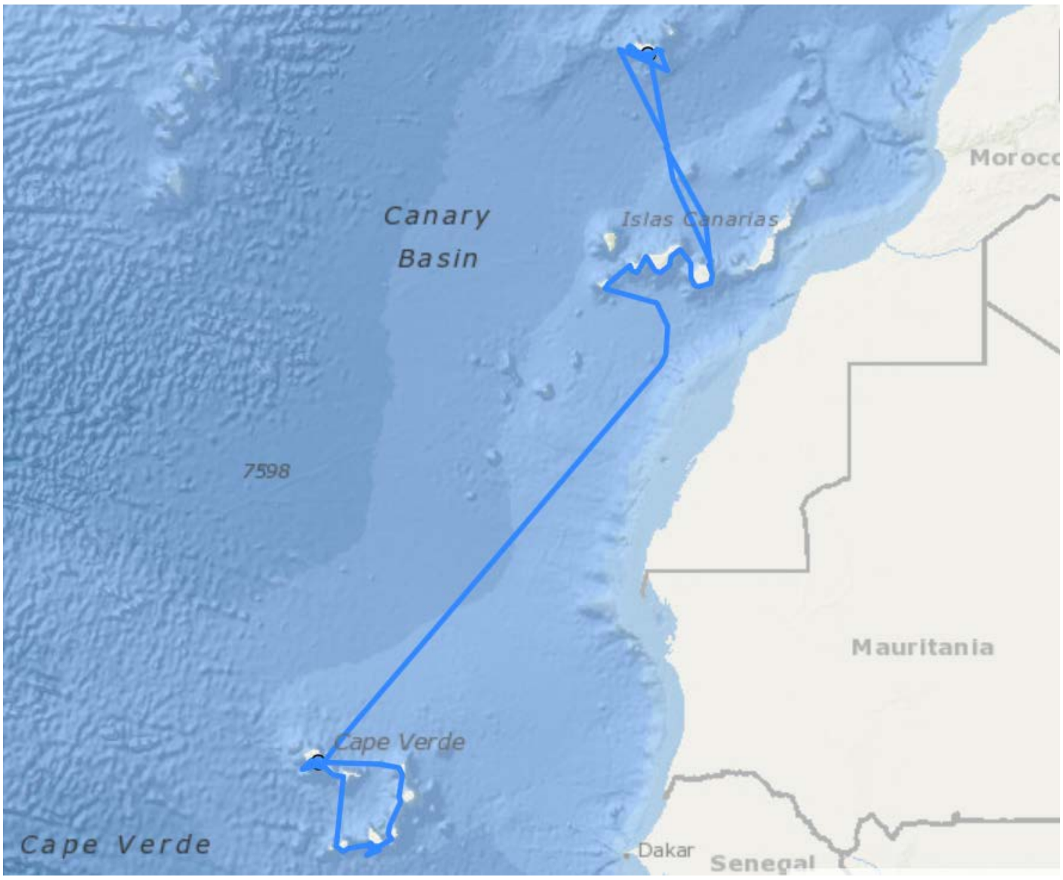


Figure 3.2: Track chart of R/V POSEIDON 533. The cruise started in Mindelo, passed Cape Verdian islands and transected through the Subtropical North-East Atlantic, passing south of the Canary Islands of Hierro, La Gomera, Tenerife and Gran Canaria, went up to Madeira, passing the Salvages, and after moving in Lee of Madeira in two different distances to the island, the cruise ended in Las Palmas on Gran Canaria.

3.2 Aims of the Cruise

The three-week cruise on RV Poseidon for summer 2019 is a follow up of previous work in the natural realm of the Mauritanian upwelling and of a cooperation/pilot study with Madeira in summer 2018 on atmosphere-ocean-island-biogeochemical cycles in the Macaronesian region. It intended to capture part of the natural and anthropogenic imprints of the atmosphere-ocean-island-biogeochemical feedbacks in this highly dynamic region. During the cruise, multiple trace gas instruments where deployed (submersible underway sensors, eddy covariance measurements and canister sampling of trace gases, discrete measurements of marine and terrestrially derived natural and anthropogenic trace gases). In cooperation between the scientists from GEOMAR, Madeira, the Canary Islands and Cape Verde, we hope to be able to explore the full potential of the huge interdisciplinary dataset that was obtained from the cruise, which is to the best of our knowledge the first of this kind. The region around the Macaronesia Archipelagos offers an ideal study area for the proposed work.

Motivation and general background

The chemistry of the atmosphere is changing radically. While the most commonly discussed change is increasing CO_2, there is a wide range of other, chemically and radiatively active trace gases that are subject to change. These gases have short atmospheric lifetimes and, hence, regional impacts, but their influence may also lead to global consequences. Ocean surface processes can exert a critical control on the fluxes of these gases to and from the atmosphere, thus impacting climate and atmospheric chemistry regionally and globally. The oceans contribute significantly to the global emissions of these climate-active gases, which include halogenated volatile organic compounds (e.g. bromoform, $CHBr_3$, iodine-containing gases), sulfur-containing compounds (e.g. dimethyl sulfide, DMS), and oxygenated volatile organic compounds (OVOCs, e.g. acetone and methanol). Such gases play a critical role, not only in global biogeochemical cycling, but also in marine aerosol formation, tropospheric ozone chemistry, photooxidant cycling (which controls the atmosphere's ability to rid itself of pollutants), and stratospheric ozone loss (Carpenter et al., 2012). Through this mechanisms cloud cover, pollutant abundance, UV-radiation and temperature are affected. The pristine, maritime atmosphere is also altered by the outflows of air pollution, thereby, modifying the oxidizing capacity and the radiative balance on both regional and global scales (see e.g. Wang et al., 2005; Shechner and Tas, 2018 and references therein).

Tropical processes are of special importance for the changing chemistry and composition of the atmosphere. The highest production rates of the hydroxyl radical (OH), which predominantly cleans the atmosphere from biogenic and anthropogenic trace gases, occur in tropical regions. Stratospheric ozone is mainly created in the tropical stratosphere and transported towards the winter pole by large-scale circulation. Most long-lived and short-lived trace gases in tropospheric air enter the stratosphere in the tropics, following the same transport pathway. Marine air under the trade inversion can be transported horizontally near the surface over long distances towards the equator with almost no vertical transport, until it reaches areas of deep convection as entrance regions for the upper troposphere and the stratosphere (Fuhlbrügge et al., 2016; Figure 3a). Thus trace gases and their atmospheric products from the subtropical and tropical boundary layer transported through the Brewer Dobson circulation, can exert their influence from the low to the high latitudes of the global stratosphere (Figure 3b).

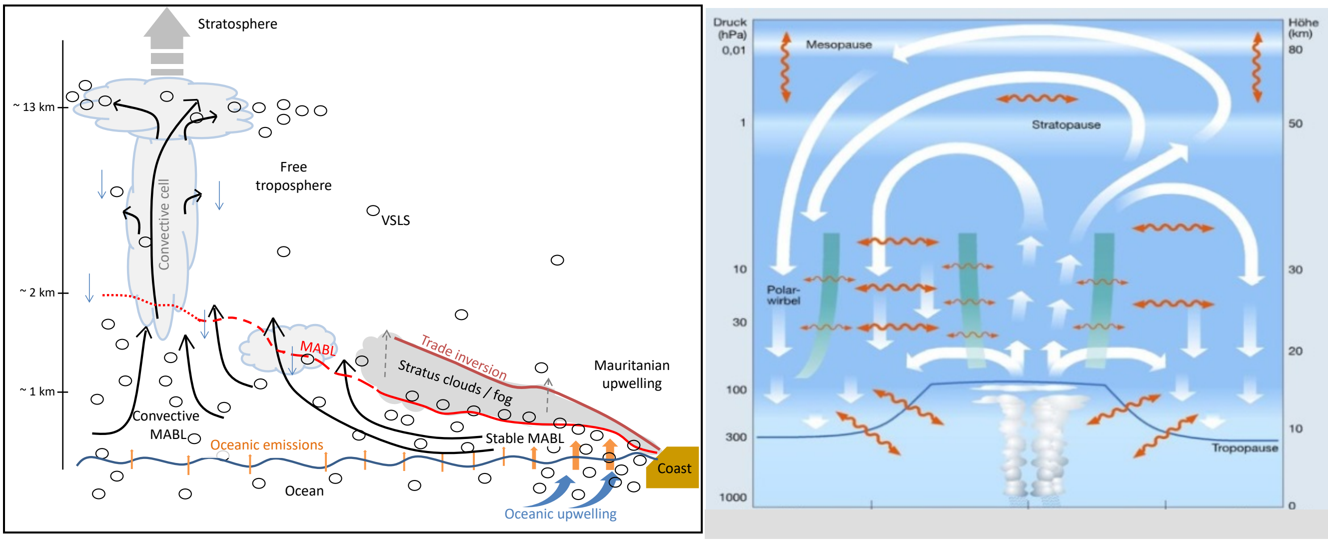


Figure 3.3: (a) Transport of air masses from the subtropics, enriched in trace gases from the ocean, towards the lower latitudes under the trade inversion (after Fuhlbrügge et al., 2015), (b) uplift of air masses by deep convection in the tropical regions into the stratosphere, following the Brewer Dobson circulation towards higher latitudes (after Engel et al., 2016).

Depending upon the concentration gradient across the air-sea interface, the ocean surface water can either be a source or sink to the atmosphere. Volatile and semi-volatile organic compounds are of special research interest, as it has been recently recognized that semi-volatile compounds from incomplete combustion processes enter the ocean in an amount equivalent to 15% of the global ocean carbon uptake (Gonzalez- Gaya, 2016, Reddy, 2016). On the other hand, oceanic emissions of new emerging sources of short-lived volatile halogenated compounds from anthropogenic activities threaten the stratospheric ozone layer (Oram et al., 2017, Tegtmeier, 2015). Effective reductions in emissions of long-lived ozone-depleting substance (ODS) are being achieved through the Montreal Protocol, however, emissions of halogenated, very short-lived substances (VSLSs) with atmospheric lifetimes of less than 6 months are not regulated. While anthropogenic long-lived chlorine and bromine trace gases dominate stratospheric ozone loss processes, marine emissions of VSLS such as bromoform ($CHBr_3$) and dibromomethane (CH_2Br_2), are also of increasing concern (Tegtmeier, 2015, Ziska, 2017, Lim et al., 2017, Liang et al., 2017). Brominated VSLS are mainly produced by natural oceanic processes and anthropogenic bromoform sources were considered to contribute only 0.3% to the global emissions in 2003. Global emissions of bromoform and dibromomethane in form of a 1°x1° climatology were derived from observations (HalOcAt-database, https://halocat.geomar.de/de) by Ziska et al. in 2013. The climatology attributes 70% of the global emissions to coastal regions. Observed tropospheric concentrations in remote locations show a good agreement with the VSLS emission climatology (Hossaini et al. 2015, Lennartz et al., 2015). Compared to model-derived top-down estimates however, the emission climatology is much lower and missing localized sources were suggested as a cause for the mismatch. Future climate projections suggest up to 30% increases of bromoform emissions by 2100 (Tegtmeier et al., 2017, Ziska et al., 2017, Liang et al., 2017). Besides the projected increase of the natural emissions, anthropogenic activities such as disinfection of seawater and macro algal farming entail an increase in the marine concentrations and emissions of bromoform (Tegtmeier, 2015). Understanding these perturbations and their effects will require multidisciplinary efforts combining oceanic, atmospheric, biological and modeling studies (Hepach et al., 2016).

Sources of bromoform

While phytoplankton and macro algae are known to produce many halogenated compounds, bromoform is generally the dominating product (Lim et al., 2017 and references therein), which appears to be related to its preferred production. It is related to the haloform-reaction, which produces poly-halogenated methanes from sea water halides, which are oxidized to hypo-halides by enzymes (Theiler et al., 1978). Correlations of the picomolar concentrations of bromoform with phytoplankton pigments sometimes show good correlations with fucoxanthin, a marker pigment for diatoms (Roy et al., 2010, Quack et al., 2007a), while also correlations to haptophytes and cyanobacteria (Hepach et al., 2014, Webb et al., 2016) have been observed. This suggests that its occurrence is related to the major abundant phytoplankton species or to biomass and that the production may occur from organic matter, which is released into the sea water from phytoplankton during growth or senescence (Hepach et al., 2016, Liu et al., 2015). The influence of ocean acidification on bromoform production from phytoplankton is currently thought to be low (Webb et al., 2016). Natural bromoform in sea water shows diurnal cycles (Abrahamsson et al., 2004) related to available light levels, with emissions increasing with stronger light, while also its photochemical decay increases (Carpenter et al., 2009). Nanomolar concentrations detected in the vicinity of macro algal beds are a possible result of defense mechanisms in the algae, producing and emitting variable bromoform levels due to stress, which is also related to light (Carpenter and Liss, 2000). Thus, increasing macro algal farming activities contribute to the global emissions of bromoform and are currently assessed at GEOMAR in the Emmy Noether group “A New Threat to the Stratospheric Ozone Layer from Anthropogenic Very Short-lived Halocarbons” from Dr. Susann Tegtmeier (2016-2021).

Bromoform is also the main volatile compound in micromolar concentrations in disinfected seawater, which is found in cooling waters from coastal power plants, from desalination plants, during ballast water treatment and in urban environments (Helz and Hsu, 1978, Boudjellaba, et al., 2016 and references therein). It has been used as tracer for the effluents (Yang, 2001). The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) providing advice to the United Nations (UN) is currently concerned with the assessment of the environmental impact of seawater disinfection processes. We urgently need more information on the abundance of halocarbons and their emissions from the surface ocean, especially coastal concentrations, their spread into the open ocean and their emissions into the atmosphere for the modelling efforts.

Aims of the cruise

Identification and modeling of the physical environment in combination with the biogeochemical parameters nutrients, the carbon system and trace gases will provide a deeper insight into the production processes of bromoformand other halcarbons. Own work has recently identified very high concentrations of bromoform in an anticyclonic eddy off Peru, which remains unexplained. Interpretation of oceanic halocarbon concentrations in the context of mesoscale activity and biogeochemical response which affect both the ocean and the atmosphere (Chen et al., 2010, Caldeira et al., 2014 and references therein) and, likely, the air- sea flux of the compounds, has not been performed before.

This realm of mesoscale activity, in combination with current-bathymetric interactions and internal waves, sets the scene for the increase in nutrients and (biological) productivity in the proximity of an island, which is defined as ‘Island Mass Effect’ (IME) (Figure 4, Gove et al., 2016). The relationship between the coastal (island) induced phenomena, responsible for the increase in the productivity and the offshore regions and whether there are gradients in biomass or community structure between inshore and offshore waters, around the small islands is not well understood (Gove et al., 2016, Caldeira, 2002, 2014 and references therein). Also, the role of natural versus anthropogenic drivers of the increased nearshore nutrient concentrations, driving the IME is not well understood (Gove et al., 2016).

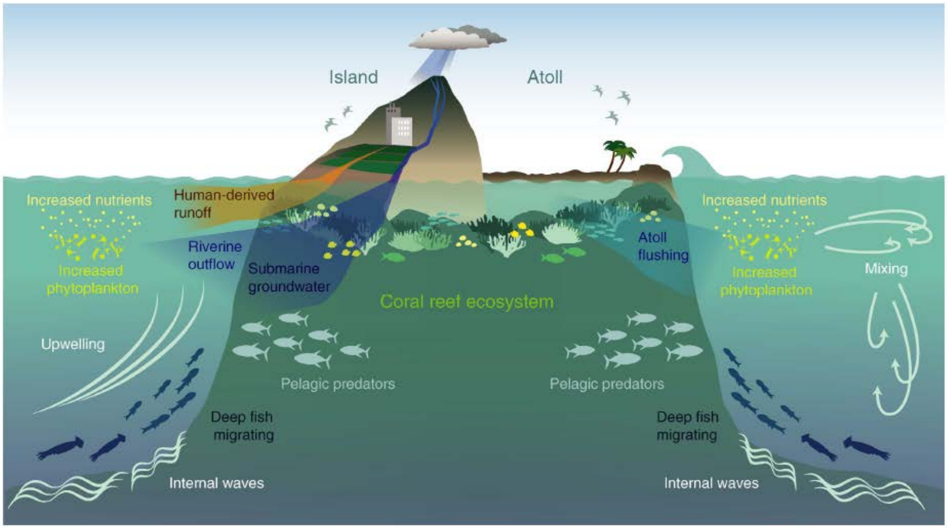


Figure 3.4: The Island Mass Effect: Localized increases in phytoplankton biomass near island- and atoll-reef ecosystems may be the result of several causative mechanisms that enhance nearshore nutrient concentrations,. Enhanced nearshore phytoplankton can influence food-web dynamics and elicit a biological response in higher trophic groups (Gove et al., 2016).

More research is needed, to properly identify and better understand the marine ecosystems associated with the IME (e.g. Caldeira and Sangrà, 2012, Couvelard et al., 2012, Caldeira et al., 2014; 2016). An alongshore coastal current, attached to the south of Madeira island, has recently been found, suggesting the formation of a persistent coastal flow, independent of the season. This coastal feature is expected to trap drifting organisms such as phytoplankton and pollutants inshore, thus forming gradients with the offshore regions. In situ studies are needed to sample the dominant processes at the inshore, transition (~200m), and offshore (open-ocean) regions in order to understand the inshore-offshore gradient and its connection to other mesoscale features. Trace gases discharged form natural or anthropogenic activities are expected to be also trapped in alongshore currents at these islands. The expected massive enhancement of bromoform at some islands, as a tracer of anthropogenic imprint, will give new insights into the various sources of bromoform, possibly allowing the identification of terrestrial and anthropogenic sources on the biogeochemical enhancement.

Atmospheric environment in the Macaronesian region

While the trade winds generally facilitate the dispersion of primary pollutants at the islands coastal environments, the local winds, characterized by typical daily sea-land breezes, create positive feedbacks that emphasize air pollution episodes (Baldasano et la., 2017). The air pollution from large cities as St. Cruz de Tenerife often expands over the ocean, made visible with data of the atmospheric observatories, which are maintained by all Macaronesian Archipe-lagos (eg. http://home.ciimarmadeira.org, www.bsc.es/caliope/es, http://www.aemet. es/en/portada, https://www.ncas.ac.uk/en/cvao-home). The Cape Verde Atmospheric Observatory (CVAO), downwind of the Mauritanian upwelling region with high marine biological productivity, offers the rare opportunity for ground-based studies of clean marine air. Although CVAO is generally considered as representative for the remote marine boundary layer, it is also possible to observe the influence of anthropogenic emissions from long–range transport from North-America and Europe (Lee et al., 2010), while the populated islands upwind are not considered as source regions. Air parcels with different regional influences mix during transport, yielding specific characteristics for continental, marine polluted,and less-polluted air masses. The concentration levels and potential sources of airborne natural and anthropogenic short-lived halocarbons in air, can be analyzed in the outflow of complex urban environments with different techniques (Sarkar et al., 2018, Song et al., 2018). Nevertheless, the anthropogenic contribution to local marine levels remains unexplored. Especially during summer air-mass trajectories are observed at CVAO, which come from low altitudes (within the boundary layer) of North America over the Atlantic (in greater heights) and descend near to the Canary Islands and at the Mauritanian upwelling before reaching the CVAO (Carpenter et al., 2010). Therefore an influence of anthropogenic emissions of the northern Macaronesian islands on the Cap Verde measurements is expected to peak during summer (Figure 4).

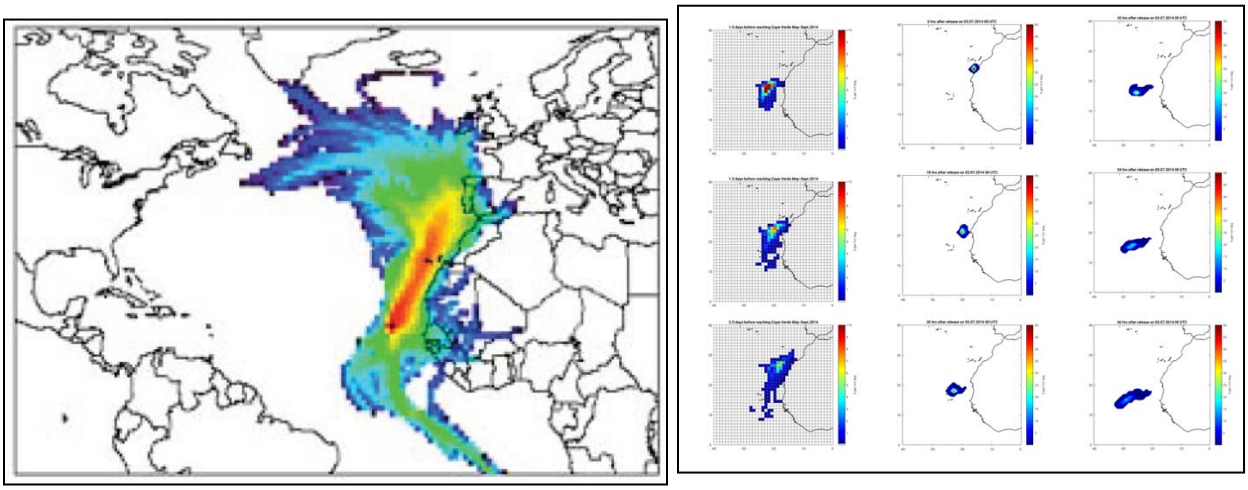


Figure 3.5: (a) Air mass transport to CVAO during summer (Lee et al., 2010). (b) Mean backward trajectories (20.000 started every 48h~1.5 Mio from May to September 2014,) show significant amounts of boundary layer air from the Canary Islands (left row), reaching CVAO in two days. Even undisturbed air masses with Canary Island characteristics occasionally reach CVAO in summer, as seen from forward trajectories (right two rows).

Observations of bromoform and other halocarbons in the northeastern Atlantic and the Macaronesian Archipelagos

While atmospheric bromoform mixing ratios over the open oceans and at CVAO are around 0.5-1 pptv (Lee te al., 2010, Carpenter et al., 2009) elevated abundances of > 12 pptv have been detected in the Mauritanian and Peruvian upwelling regions during several GEOMAR and other cruises (Carpenter et al., 2007, Quack et al., 2007b, Fuhlbrügge et al., 2013, 2015 a,b, Hepach et al., 2014). The brominated and iodinated trace gases, such as bromoform, dibromomethane and methyl iodide were related to phytoplankton and photochemical reactions in the surface waters. The high mixing ratios of bromoform and other trace gases closer to the coast were associated to their accumulation in shallow marine boundary layers, but could occasionally not be explained by local emissions or by long-range transport. High concentrations at the coast possibly as anthropogenic inputs have been proposed as likely contributors (Carpenter et al., 2009, Fuhlbrügge et al., 2013, 2016).

Baseline studies of reactive volatile halogenated compounds in the Macaronesian Archipelagos were first conducted in the 1990’s by Class and Ballschmiter (1986, 1988), Frank et al. (1991), Fischer et al., (2000). The early measurements revealed atmospheric bromoform of 200 - 460 pptv on beaches of the islands Tenerife and the Azores and up to 26,000 pptv were also measured directly over a rock pool on Gran Canaria (Ekdahl et al., 1998), indicating macroalgae to be the most likely cause of these high concentrations. These are the highest atmospheric mixing ratios ever recorded, and historically bromoform has always been seen as a biogenic marine marker in air (Hepach et al., 2014). In light of a few recent measurements in arbitrarily picked coastal sampling locations (Quack et al., unpublished data 2016, 2017), concentrations were found to be extraordinarily high in some regions, as at beaches in the south and north-east of Tenerife, with no visible macro flora around, but with possible anthropogenic input. An identification of the sources remains an open research task.

The southern islands of the Macaronesia Archipelago provide an ideal region to investigate the anthropogenic imprint of bromoform over the natural background. The islands themselves have possible different anthropogenic imprints, such as power stations, desalination plants and recreational water outflow, thus offer a great potential as exemplary regime to infer information for the anthropogenic interaction with marine biogeochemical cycles in order to improve the global assessments. We hypothesize that bromoform is a major anthropogenic compound in many populated coastal regions and the level of urbanization and industrial activities is a measure for its coastal concentrations, which will extend the natural background. We further hypothesize that part of the elevated abundances of atmospheric bromoform and its reactive oxidation products at the Cape Verde Atmospheric Observatory (CVAO) during summer (Read et al., 2008, O'Brien et al., 2009, Lee et al., 2010) is related to air mass transport from the Canary Islands. The anthropogenic imprints from these islands (2 Mio inhabitants and 15 Mio tourists each year) make them good candidates for contamination of the regional marine environment. Thus, not only the upwelling systems, or long-range transport form North America or Europe act as sources, but the anthropogenic foot print of the different islands may lead to enhanced bromoform as well as other trace gases in high concentrations at CVAO.

The participants of this proposed cruise in the dynamic region of the southern Macaronesian Madeira, Canaries and Cape Verde Archipelagos under the trade inversion will mutually benefit from the cooperation. Trace gas expertise and measurements with atmospheric chemistry transport modeling from GEOMAR, atmospheric observations from the US, modeling of the atmosphere-ocean-island mesoscale effects and phytoplankton expertise from Madeira as well as expertise on the marine carbon cycle from the Canaries, will deliver new insights into the biogeochemical cycles, sources, sinks, emissions and onshore-offshore gradients of bromoform as well as other trace gases, in a highly complex environment of island-induced mesoscale activity and anthropogenic imprints.

The three main goals of the expedition are:

1.) Understand the sources, distribution, emissions, gradients and transport of bromoform from urbanized coastlines into the open ocean

We will use bromoform as a proxy to trace coastal water and air transport, to quantify its abundances and sources and try to assess its local, regional and possibly global impact as the first major goal during the proposed cruise. We will also try to assess the potential impact of other DBP in the aquatic environment (Local to global).

2.) Testing bromoform and other halocarbons and to identify the anthropogenic imprint on the island-induced biogeochemical enhancement in oligotrophic settings

The intensive anthropogenic activities along the island of Tenerife suggests bromoform as a possible proxy for the identification of the terrestrial and anthropogenic imprint of the island-induced biogeochemical enhancement of nutrients and productivity, which is the second goal of the proposed cruise.

3.) Identification of the air-sea fluxes and atmospheric transport of terrestrial natural and anthropogenic trace gases to assess their impact on marine biogeochemical cycles

The third goal of the cruise is to identify the regional air mass transport and air- sea exchange of several trace gases, to identify deposition to and outgassing from the ocean.

During summer biological production, anthropogenic and natural imprints near the coasts and gradients of physical, chemical and biological parameters towards oligotrophic waters offshore can be sampled under a relatively stable trade inversion with steady trade winds from a North-north eastern direction, bringing air from the Northern subtropical Archipelagos towards Cape Verde (CVAO). We measured trace gas concentrations (O_2, CO_2, N_2O, halocarbons and other reactive trace gases of natural and anthropogenic origin) in deep and surface water and the overlying atmosphere, as well as physical (atmospheric boundary layer conditions, SSS, SST, diapycnal mixing), chemical (nutrients, CDOM/FDOM) and biological (phytopigments, phytoplankton size distribution) parameters.

The analysis of the measurements will deliver (evaluation):

- Concentrations of coastal halocarbons in air and in water (sources, emissions and their transport across the open ocean, tracer for anthropogenic imprint on the island induced mass effect)

- Mixing ratios of airborne natural and anthropogenic reactive trace gases of different lifetimes and sources (impact on atmospheric chemistry and on ocean biogeochemistry, identification of sources)

- Air sea fluxes of CO_2 (derive values for the air- sea transfer coefficients, identification, marine and terrestrial air masses)

- Concentrations of O_2, N_2O, pCO_2, (island induced upwelling, biological activity)

- Dynamics of island-induced processes (island wakes, eddies and circulation, upwelling cells/rates) and consequ. enhancement of nutrients, phytoplankton (island mass effect).

- Radiosounding (boundary layer height, trade inversion, atmospheric stratification and circulation regime)

This sampling program was intended to detect gradients, concentrations and fluxes from the nearshore regions to the open ocean (near- to far-field approach). We investigated the island wakes in an intense sampling program in both the atmosphere and ocean towards the open ocean, trying to catch mesoscale features and island induced phenomena, in order to understand their interaction and transport towards the open ocean. Intense underway sampling (continuous and 3 hourly) of oceanographic, biogeochemical and biological parameters was conducted to deliver unique insights into the dynamic atmosphere–ocean–island-biogeochemical interactions in the highly coupled marine system of the NE Atlantic Basin.

We aim to understand the sources of bromoform and of other natural and anthropogenic trace gases from the differently populated islands of the southern Macaronesian region and their transport and air- sea fluxes. The different sources and atmospheric lifetimes of the investigated compounds will support the interpretation of the dynamic local coupling between ocean and atmosphere and the transport between the islands. Current modelling efforts to understand the anthropogenic signal of marine halocarbon emissions and their impact on tropospheric oxidation and stratospheric ozone will also benefit significantly from the huge data set that was obtained from the cruise.

While the cruise was intended to be conducted in summer, to test some of the hypotheses which are only occurring in the summer (as the northerly transport from the Canaries to the CVAO, and shallow mixed layers), the ship time was granted for early spring 2109, which yielded completely different conditions (dust storms from Africa, deep mixed layers). To get n idea of the dynamics of the region, we decided to conduct the cruise to get a baseline and as a start for further investigations.

3.3 Agenda of the Cruise

Purpose of research and general operational methods.

The cruise transited through the open ocean and at the closest possible safe distance to the coast of twelve Macaronesian islands, in general in lee of the islands along the 100 to 50m depth line, to detect terrestrial influences on water and on the atmosphere. It alternated between on–shore and off-shore conditions. The cruise track of 2600 nm was planned to catch chemical, biogeochemical and biological imprint of the islands, fading away offshore and in deeper waters. We start the cruise in Mindelo in order to steam against the prevailing trade winds, to avoid ships contamination. We measured trace gas concentrations (O_2, CO_2, N_2O, halocarbons of natural and anthropogenic origin and DMS and isoprene) in deep and surface water and the overlying atmosphere, as well as physical (atmospheric boundary layer conditions, SSS, SST), chemical (nutrients, CDOM/FDOM) and biological (phytoplankton pigments and size distribution, microbial community) parameters. Biological production, anthropogenic and natural imprints near the coasts and gradients of physical, chemical and biological parameters towards oligotrophic waters offshore were sampled. The sampling program intended to detect gradients, concentrations and fluxes from the nearshore regions to the open ocean (near- to far-field approach) and features of long-range transport in both atmosphere and ocean. Intense underway sampling (continuous and 3 hourly) of oceanographic, biogeochemical and biological parameters, accompanied by depth profiling with a CTD- bottle rosette sampler delivered unique insights into the dynamic atmosphere–ocean–island-biogeochemical interactions in the highly coupled marine system of the NE Atlantic Basin.

Timing of the cruise:

- 25^{th} of February: Arrival of participants in Mindelo
- 26^{th} to 27^{th} of February: Setup of equipment in Mindelo harbour
- 28^{th} of February: Departure of expedition POS533 from Mindelo
- 14^{th} of March: Personnel exchange in Las Palmas
- 19^{th} of March: Personnel and sample drop-off in Funchal
- 22^{nd} of March: End of expedition POS 533 in Las Palmas

The scientific program started immediately with continuous underway measurements of SST, SSS, pCO_2, N_2O, O_2 and gas tension continuously in the surface water. The sampling of atmospheric CH_4, CO_2 and watervapor at three different heights also started immediately. A regular 3 hourly underway sampling program of air canisters, for marine halocarbons, nutrients, phytopigments, phytoplankton size distribution, POC/PON, CDOM/FDOM and bacteria was conducted..

Underway measurements (continuous, 3 hourly, 180 surface samples): A submersible pump in the ship's moon pool supplied continuous water flow to several instruments. The same water lines were used to take discrete samples for parameters that could not be measured continuously and for calibration of the continuous measurements. In addition, a thermosalinograph was installed next to the pump, so SST and SSS directly at the seawater intake is available. The ratio between chromophoric dissolved organic matter (CDOM) and its fluorescent part (FDOM) will be used to identify sources of DOM. Underway conductivity-temperature-depth profiling increased the resolution of physical surface parameters. Ocean currents were profiled (0-120m), using a hall-mounted ADCP (120khz)

Station work: On stations, three to four deployments were conducted. A) CTD casts between < 600m=shallow (0.5 hr) and 4000m= deep (3hr) depth, B) Microstructure profiling (0.45 hr), and c) a Teflon-pump for iron sampling, D) Radiosounding (0.15 hr). Thus shallow stations are 1.5 hrs, while deep stations lasted 3 hrs. 20 shallow (3 deep) stations in Madeira waters, 30 shallow (3 deep) stations in Canary island waters and 12 shallow (3 deep) stations in Cape Verde waters were conducted. The shallow CTD-stations were planned as regular inshore - offshore stations. On stations, the ship was positioned in a way that the bow is heading into the wind. The CTD stations sampled deeper water and in order to identify the vertical extent of surface features SST, SSS, O_2 and phytopigments (including chlorophyll) in the near island, wake and eddy influenced water columns. One full-depth CTD cast (3600 m water depth) was performed at the Cape Verde Ocean Observatory (CVOO) in order to extend the biogeochemical time series data set. Microstructure measurements were conducted to determine the turbulent mixing in the upper 200 m. In order to estimate small scale mixing processes (as diapycnal mixing) regular measurements with the microstructure profiler were conducted until the microstructure probe, most likely due to a fast undercurrent was trapped by the ships thruster and lost (first station after transit to Canary islands).

Chemical, biogeochemical and microbial phytoplankton: Underway every three hours and at CTD stations water samples where obtained by the rosette system, for obtaining halocarbon DMS, isoprene, CO_2, N_2O DOC, POC, pH, nutrients, pigments, phytoplankton size distribution, microbial diversity and abundances and other parameters. Microbial analysis and genetic information will be treated according to the Nagoya protocol. Filtered seawater (1 liter) in some selected stations at a depth of 30 meters for the analysis of iron was taken with a small Teflon pump..

Radio sounding: We profiled the atmospheric marine boundary layer with radio sondes, to identify the atmospheric stratification. About 60 profile s were collected.

Halocarbons (180 surface, and 36*7 deep): A purge and trap system, coupled to a gas chromatograph with mass spectrometric detection (PT/GC/MS) was used to measure discrete and underway samples for brominated, chlorinated and iodinated, as well as mixed halogenated compounds, such as **CH_3I, $CHCl_3$, CH_2Br_2, CH_2ClI, CH_2BrI, $CHBr_2Cl$, $CHBr_3$, and CH_2I_2.** These measurements will be used to investigate the surface and depth distribution and sources of the short-lived halogen compounds and their oceanic emissions.

DMS/Isoprene: (180 surface, and 36*7 deep): A second purge and trap system, coupled to a gas chromatograph with mass spectrometric detection (PT/GC/MS) was used to measure discrete and underway samples for DMs and isoprene**.** These measurements will be used to investigate the surface and depth distribution and sources of the short-lived halogen compounds and their oceanic emissions.

Phytoplankton sampling: At CTD stations water samples at discrete depths will be obtained by the rosette system. On board water samples (2-4 L) were filtered for obtaining phytoplankton size distribution of microphytoplankton (± 20-200 µm) and nanophytoplankton (± 2-20 µm). Additionally, a small volume (few mL) was preserved onboard for later analysis of picophytoplankton (± 0.2-2 µm). Methodologically, the size distribution was analyzed by determining phytopigment signatures (UHPLC) and chemotaxonomic processing, microscopic enumeration, as well as enumeration by flow cytometry.

Nutrient sampling: (180 surface and 48*12 deep water) where sampled for the determination of micro-nutrients (Nitrate, Nitrite, Phosphate and Silicate).

Eddy covariance measurements (continuous): Direct flux measurements of CO_2 will be used to understand the physical and chemical constraints on gas exchange. These measurements will give an independent estimation of k. The measurements are made at the frequency of turbulent motions in the atmosphere (10^{-4} to 1 Hz) and averaged over 10 - 60 minute intervals. These short intervals correspond to the variability in physical forcing of gas exchange (e.g. wind shear, wind bursts, breaking waves). No other technique provides the same ability to directly derive the gas transfer coefficient on the time scales of its forcing parameters.

Air canister sampling (200 samples): We conducted the samling of air with a metal bellows pump on the monkey deck of Poseidon. Every three hours an air sample was taken in stainless steel canisters and was sent to the lab of Prof. Dr. Elliot Atlas at RSMAS in Miami after the cruise. The samples where analyzed for more than fitfty **marine** and anthropogenic trace gases, including **CH_3I, CH_2ClI,** CH_3Cl, **CH_3Br, CH_2BrCl, CH_2Br_2, $CHBrCl_2$, $CHBr_2Cl$, $CHBr_3$, OCS, DMS,** CFC11, CFC12, CFC112,CFC113, CFC114, HFC134a, HCFC22, HCFC142b, HCFC141b, Halon1211, Halon2402, **MeONO2, EtONO2, Ethane, Ethene, Ethyne, Propane, n-butane** and **isoprene**. The data from these analyses will be used for the calculation of air-sea exchange of halocarbons measured in the water samples and for input in and for the evaluation of the intended modelling. The analysis of a suite of 50 different compounds in the atmosphere from different sources and with varying lifetimes from minutes to centuries by Prof. Dr. Elliot Atlas, has been performed during several joint cruises and air craft campaigns in the global oceans and atmosphere (e.g. Krüger and Quack, 2014, Atlas et al., 2013, 2017).

The data set will deliver unique insights into the dynamic and chemical couplings of the island wakes in both atmosphere and ocean in the anthropogenic influenced atmosphere-ocean-island-biogeochemical system of the Macaronesia Archipelagos, as well as their regional couplings.

4 Narrative of the Cruise

The compilation of the three weekly reports of AIMAC are presented here, as cruise narrative. They, were also prepared in German

First weekly report of R/V *Poseidon* Expedition POS 533 - AIMAC

Atmosphere-Ocean-Islands-Biogeochemical interactions in the Macaronesian Archipelagos of Cabo Verde, the Canaries and Madeira (28.02.-03.03.2019)

Mindelo (Cape Verdes) - Las Palmas (Gran Canary) - Funchal (Madeira) - Las Palmas

First of all, we wish all Carnival parades in Germany the best from bord (red circle) for today. The wind forecast (www.windy.com) shows strong storms approaching from across the Atlantic, but hopefully they weaken before they reach Germany and the local carnival. We keep our fingers crossed from a calmer area, where Tuesday is the carnival day, which we also notice on board in the international team of 11 scientists and 14 sailors.

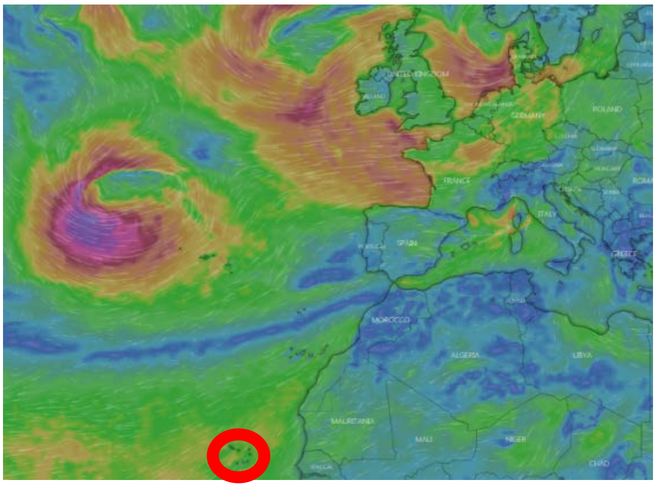


Figure 4.1: Weather-forecast for Rose-Monday, the 04.03.2019 (www.windy.com).

Biologists, oceanographers, meteorologists, marine and atmospheric chemists from Cape Verde, Gran Canary, Madeira, Denmark, France, the USA and Germany form the group around AIMAC, which is interested in the influence of Cape Verde, of the Canary Islands and Madeira on the physics, chemistry and biology of the surrounding subtropical Northeast Atlantic. During the expedition, new scientific methods are used to distinguish between natural and anthropogenic interactions of the islands with the sea and the atmosphere. The measurements will generate the first comprehensive biogeochemical dataset of phytoplankton, microbiology, trace gases, carbon, oxygen and nutrient cycles from the region near the islands in exchange with the open ocean.

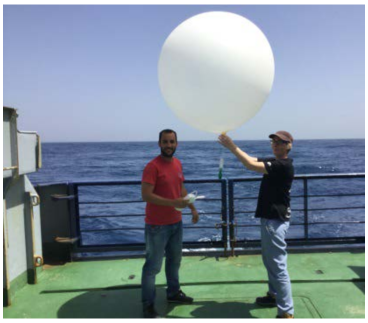
After meeting in Mindelo on Monday, February 25, to discuss the expedition, we boarded the ship on Tuesday at 9:00 am to unload a container, get a second on board as a laboratory, and began building our instruments. We had energetic support from three setup helpers from Madeira, Portugal and from GEOMAR, where Rene Witt showed a very effective and successful engagement, so that when he left the ship on Wednesday evening, all equipment worked perfectly, which they still do now do. Thank you again and thanks to Rui Salgado and Rui Caldeira for all their help. Wednesday was rounded off by the visit of twelve students of the Escola Salesiana.

Figure 4.2: Poseidon mit Kapitän Günther, den AIMAC-Wissenschaftlern und Schülern aus Mindelo.

Now the PICARRO records every second the atmospheric concentrations of carbon dioxide, methane and water vapor from three different vessel heights, which are later used to calculate the flux of these gases across the sea surface. Several sensors in the water automatically measure the pH, the oxygen content, the total pressure of all gases in the water, the surface temperature, the salt and phytoplankton content. A submersible pump continuously pumps many liters of water from the surface into the laboratories and supplies the equipment. From this seawater supply, we take 3-hour samples, some of which are measured immediately on board or later examined in the various participating laboratories. For the immediate measurement of various trace gases in the water, we have brought two highly sensitive mass spectrometers, which fortunately also provided the first good results immediately after the start of the campaign and run smoothly so far. Radiosondes for measuring the dynamics and structure of the lower atmosphere are started regularly and the program is complemented by the targeted use of a bottler rosette sampler, which brings ten liters of water from different depths to the surface. Two bottles from the same depth are necessary to meet the needs of all scientists on sample water here aboard. Sensors attached to the instrument measure the depth profile of temperature, salt, oxygen, chlorophyll and light. We got off to a good start and were able to prove our seaworthiness six hours later at the second deep station in front of Santo Antao, which was pretty well done. We went along Sao Vicente and Nicolau on to Fogo, which we unfortunately did not get to see because the Sahara dust clouded the view of the imposing volcano on the way and when we arrived at our station near the island it has been night. On Friday, March 1, we arrived Santiago, the largest island of the archipelago with the capital Praia in the morning. The deep station with the ship's winch at 3000 m succeeded well. Shortly thereafter, however, a crack was discovered in a cast-iron pipe of the winch hydraulic system, which could now be masterfully repaired with state-of-the-art material. However, since the repair resin had to harden for 24 hours, we were able to use the deep profile break to study the chemistry, biology and physics in the lee of the island, in contrast to the exposed coastal waters. We drove four very different stations in front of the island in the course of the day three times each and through this "Santiago Comparison Study" we now have a fantastic record that will reveal some secrets of the "wake".

Figure 4.3: Santiago comparison study (Wake/Exposed – in/out).

Magdalena and Melchor from Las Palmas (Canaries).



Teresa and Jesus from Funchal (Madeira).

Corinne from Mindelo (Cape Verde) .

Second weekly report of *RVPoseidon* Expedition POS 533 - AIMAC Atmosphere-Ocean-Islands-Biogeochemical Interactions in the Macaronesian Archipelagos of the Cape Verdes, the Canaries and Madeira (04.03.-10.03.2019)

Mindelo (Kap Verden) - Las Palmas (Gran Canaria) - Funchal (Madeira) - Las Palmas

After we finished our station work near the islands of Boavista and Sal on Monday evening, we used the crossing to the north side of the island of Sao Vicente for a small costume party, where Melchor and Magdalena won the prize for the best costume. They showed the ocean in a healthy state with many different organisms and in a "high CO2" world where jellyfish dominate biodiversity. The nightly radiosonde, to measure the boundary layer dynamics, was started in teamwork by Jesus and a zebra (Fig. 4.5), but after all the strange figures had disappeared the next morning, the work continued as usual.

Figure 4.4: Magdalena and Melchor show the oceans condition in climate change in a high CO2 world.

Figure 4.5: Radiosonde launch on the evening of March 4 to measure the atmospheric boundary layer.

A flat surface station up to 150 m water depth in front of the - CVAO (Cape Verde Atmospheric Observatory, Fig. 4.6.), then a final deep sampling from 3500 m water depth at the time station CVOO (Cap Verde Ocean Observatory) of GEOMAR, and then we started the transit to the Canary Islands. On the way, 3-hourly water and air samples were taken from the surface as usual, which were immediately investigated in the laboratory for trace gases, nutrients and phytoplankton (Fig. 4.7).

Figure 4.6: Sao Vicente with the Atmosphere Observatory CVAO

The weather forecast was good and we were optimistic that we could do the 700 nautical miles in about four days and reach our first station in Spanish waters during the night from Saturday to Sunday. But not only we but also the weather forecast was too optimistic. The reality in the last five days consisted of winds 7 to 8 against which the Poseidon steamed untiringly and of 5 to sometimes even 6 meters of sea. So today we continued the fifth day rocking and rolling with the waves, whipping up and down, being abruptly slowed down or accelerated. Although it is quite exhausting, we have almost become accustomed to the endurance gymnastics, as the ship movements require permanent balancing and balance, whereby one or the other bruise cannot be avoided, since some movement still comes as a surprise. Spectacular images of ocean dynamics were also possible in the last few days (Fig. 4.8).

Figure 4.7: The mass spectrometers of Dennis and Helmke have been measuring volatile, sulphurous and halogenated compounds in seawater since the beginning of the voyage.

Figure 4.8: Swell between Cape Verde and the Canaries (Dennis Booge).

Tonight, however, we will finally arrive at our first station off the Canary Islands, where in the next three days we will conduct intensive depth and surface profiling in the immediate vicinity of the islands of Hierro, Gomera, Tenerife and Gran Canaria and measure various parameters in the sea water and air (Fig. 4.9).

In the water samples we examine exactly, as in the surface samples on the transit, various biogenic and anthropogenic trace gases, the marine carbonate system, nutrients, the organic matter in seawater, the phytoplankton community and their diversity. On Thursday afternoon, a harbor entry is planned in Las Palmas, where a part of the scientific crew will change. The continuously measuring devices are occasionally turned off by magic hand, whereby we could not clarify the cause yet. However, the sensors were generally noticed immediately by red flashing warning messages, so that we were able to restart them quickly and have so far lost only a minor amount of data.

Figure 4.9 Claudio prepares the next CTD and pins the UIs on. Each bottle receives a unique number (Unique Identifier), which is then also assigned to the water samples to facilitate later identification of the examined parameters.

In the rather phytoplankton-poor marine area south of the Canary Islands, we crossed a filament that, as an offshoot of the Mauritanian upwelling area off the African coast, transports diatoms and other microorganisms into the open ocean (Fig. 4.10), supported by intense eddy activity in this area (Fig. 4.11) is. The measuring instruments showed an expected increase of some trace gases, such as bromoform, which is an ubiquitous metabolic product of marine algae. However, since it also occurs in large quantities in anthropogenic disinfection processes, we expect high concentrations in coastal areas of the Canary Islands in the next few days.

Everyone is looking forward to a calmer sea near the islands.

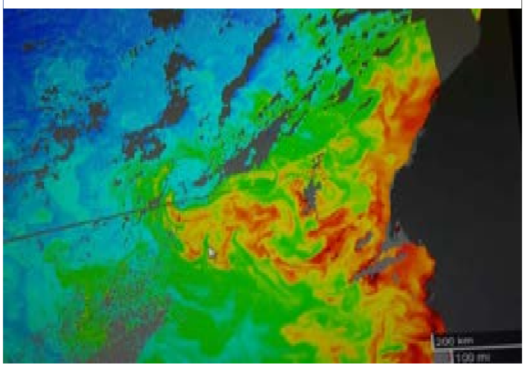


Figure 4.10: Elevated chlorophyll (www.worldview.atomdata.nasa.gov) content in a filament from upwelling

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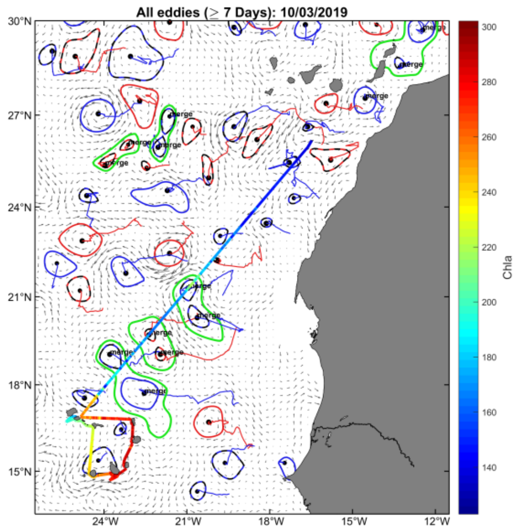

Figure 4.11: Eddy activity off West-Africa with route of Poseidon and Chl a (Claudio Cardoso).

Third weekly report of *RVPoseidon* Expedition POS 533 - AIMAC
Atmosphere-Ocean-Islands-Biogeochemical Interactions in the Macaronesian Archipelagos of the Cape Verdes, the Canaries and Madeira (11.03.-170.03.2019)

Mindelo (Cabo Verde) - Las Palmas (Gran Canary) - Funchal (Madeira) - Las Palmas

At midnight on March 11, we reached our first station about 70 km off the Canary Islands, after five days of a very rough transit with continuous sensor recordings of temperature, salinity, chlorophyll, oxygen, pH, meteorological parameters, carbon dioxide and methane and three hourly sampling of atmosphere and ocean. Due to time constraints, we had to drop the planned station transect off the islands in 150 km distance. At the station Transect C9_600 (Fig. 4.12) there was still strong wind, waves and current. Everyone was sure that the routine use of the microstructure probe (VMP), as often done, was possible without any problems. After 80m free fall of the probe and correct ship drift, however, the line of the VMP caught suddenly and unexpectedly in the propeller (we suspect a strong undercurrent) and all liberation attempts were not successful. Thus, the knives fitted especially for such incidents on the screw did their work, freed the ship and the probe of our Madeira colleagues disappeared in the depths. This sad loss now prevents us from measuring the turbulent vertical velocities of the upper water column, but luckily, our Portuguese colleagues have now recovered from the shock. Part of the missing data we can replace with measurements from the ADCP that scans the flow velocities in the upper 120 meters of the ocean. All other devices continue to work properly. Over the next three days, the route passed the spectacular sceneries of the islands of El Hierro, Gomera, Tenerife and Gran Canary and we performed deep water sampling casts every 2 to 4 hours and the 3 hourly underway sampling continued in parallel.

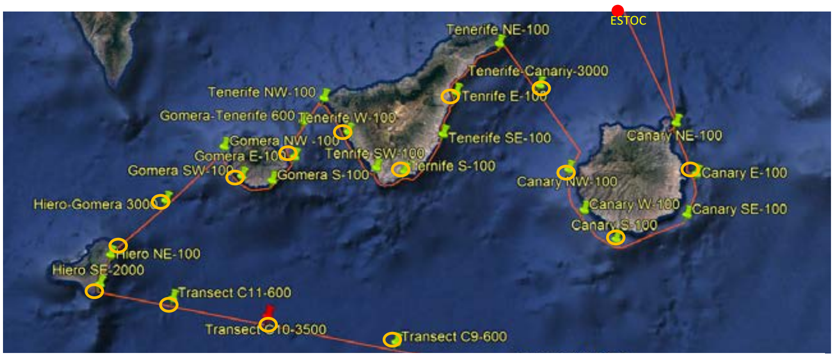

Figure 4.12: Route und station plan for the Canary islands

Figure 4.13: a) Sampling of iron off Tenerife b) Air sampling off Gran Canary, c) Entry into Las Palmas.

In the vicinity of the large islands (2 to 3 km away from Tenerife and Gran Canaria) we found, as expected, high concentrations of halogenated hydrocarbons in some places. The upper water column was well mixed between 120 and 200m due to the prevailing winter conditions. This made the concentration signals originating from the islands - presumably by dilution- lower than we had expected. The lack of sleep during the three days of intensive station and underway work was well tolerated, and when we arrived at Las Palmas on the afternoon of March 14 as planned, everyone had enough energy to go ashore. Since we did not leave until the next morning, Melchor and Magdalena took the opportunity to show us their Las Palmas in the evening, which we really liked. Thank you again a lot for that. There we were together with the disembarking Melina, Corinne and Jesus for the last time and the newcomers Franziska, Catia and Ricardo.

Unfortunately, Antonio from Mindelo could not arrive in Las Palmas, as a sandstorm (Fig. 3) lead to the cancellation of all flights to Cape Verde and there was no substitute, which would have allowed him to reach the ship in time for departure. So Claudio from Funchal stayed, against the original planning on board, which was very positive for the training of his new colleagues and the continuity of operations on board. In good weather we left Las Palmas, sampled the Spanish ESTOC time series in the evening and set up a stopover at the Selvagens. This small archipelago of the Portuguese was crossed at the same time by a great cruise ship, which underlines the attractiveness of this protected area and we managed to sample the clean sea air before we were overtaken by the giant. Then we continued through the nutrient-poor regions of the subtropical north-east Atlantic to the first transect station before Madeira, which we reached today at one o'clock midday. Until the time we arrive in Funchal on March 19 and our Portuguese colleagues and their samples will be released from the boat, nineteen stations at different local distances are planned in the lee of the island, which will take place every two to three hours. In Funchal we finish our sampling, will measure the last trace gas samples on March 20 on the way back to Las Palmas and on March 21, dismantle all equipment and stow it in our boxes, which will then arrive in Kiel with the Poseidon in early April.

Figure 4.14: Sandstorm off Mauritania on March 12th (www. windy.com).

After the end of the stations of POS 533, we collected hundreds of air samples in numerous boxes, thousands of water samples in bulging refrigerators and freezers, as well as thousands of data, waiting for their evaluation. For the moment, the data indicate that the winter deep mixing of the oceanic surface layer in March results in a strong dilution of all contained compounds, and therefore lower concentrations of the volatile halogenated hydrocarbons, especially of bromoform, were found, than we had expected for the summer months. Especially on the eastern side of the islands, the wind-facing side, the mixing was particularly deep. However, mixing and deep-water upwelling off the African coast also led to local phytoplankton blooms, as shown by the distribution of freshly produced isoprene (Figure 4). The phytoplankton also produces sulfur-containing and halogenated trace gases, which concentrations, however, can only be determined in Kiel, as well as the content of dissolved and particulate organic carbon, as well as fluorescent and colored dissolved organic matter in the water. The phytoplankton composition will be investigated in Funchal, the presence of other microorganisms in Odense, the concentrations of non-volatile disinfection by-products in Marseille, the carbon cycle in Las Palmas and atmospheric trace gases in Miami. We look forward to the data and the cruise meeting that we planned for early November in Funchal, where I hope most of the samples will be measured and data evaluated.

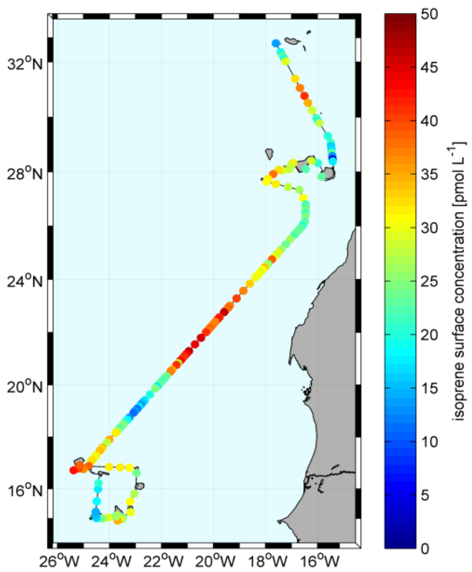

Figure 4.15: Isoprene in surface water of the subtropical North-East Atlantic (Data from Dennis Booge).

5 Preliminary Results

5.1 Meteorological and oceanographic conditions

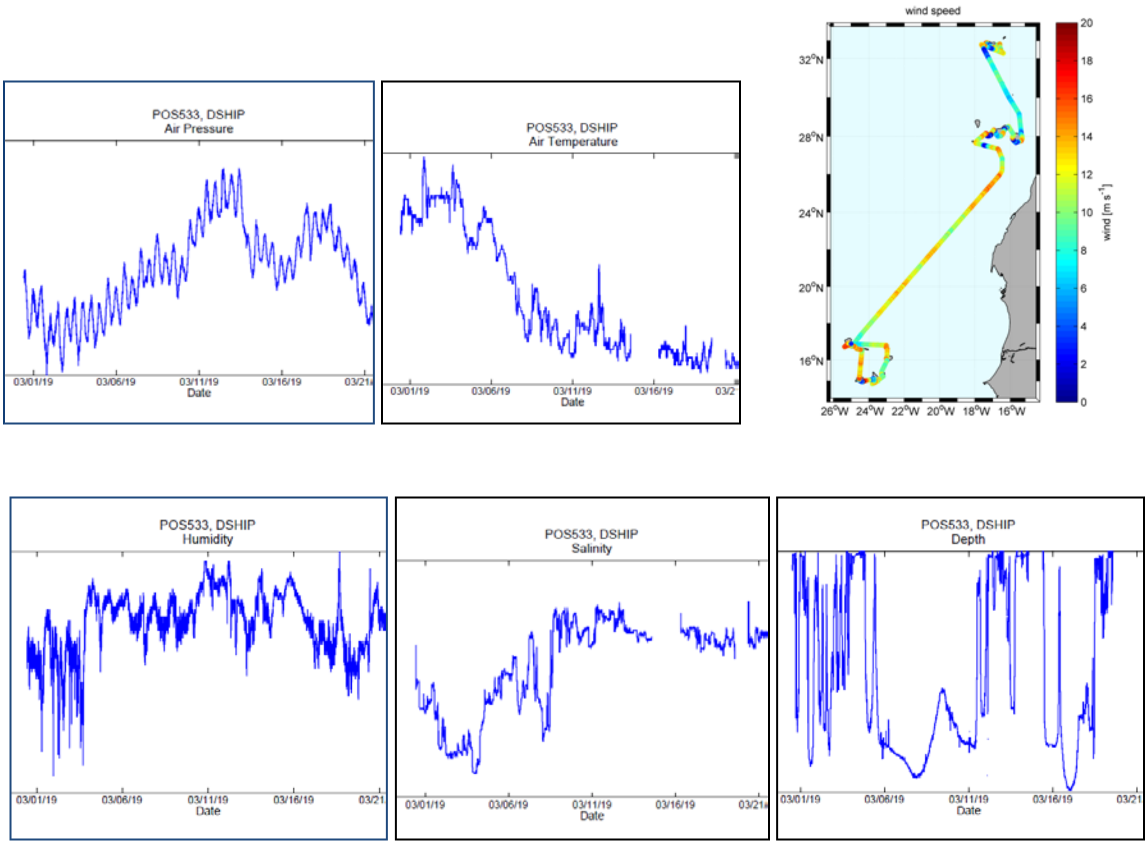

Figure 5.1: Atmospheric pressure, temperature, wind speed and humidity during POS 533, salinity and depth.

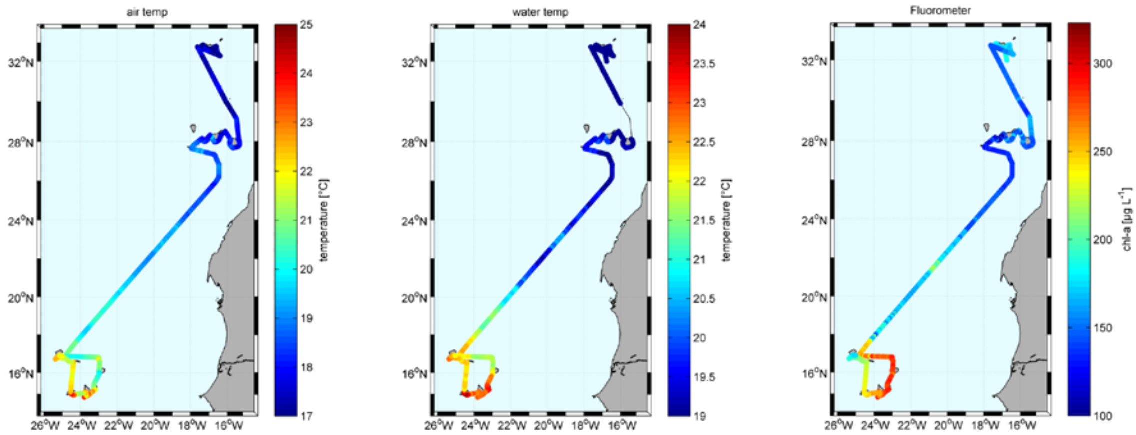

Figure 5.2: Air- and water temperature as well as fluorescence (raw data) along the cruise track.

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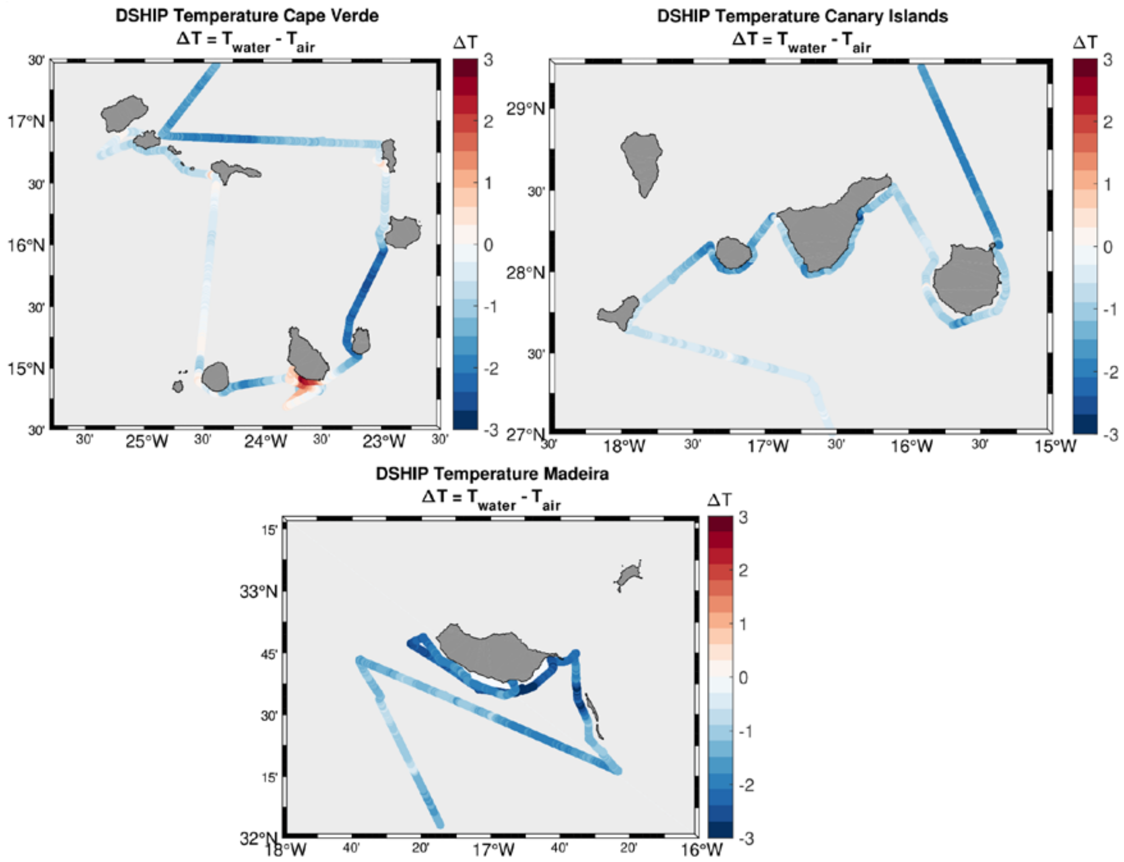

Figure 5.3: Throughout most of the cruise, air temperatures are higher than ocean surface temperatures which results in a energy flux towards the Ocean. However, at the southern coast of Santiago. DeltaT is positive, resulting in a flux from the Ocean towards the atmosphere.

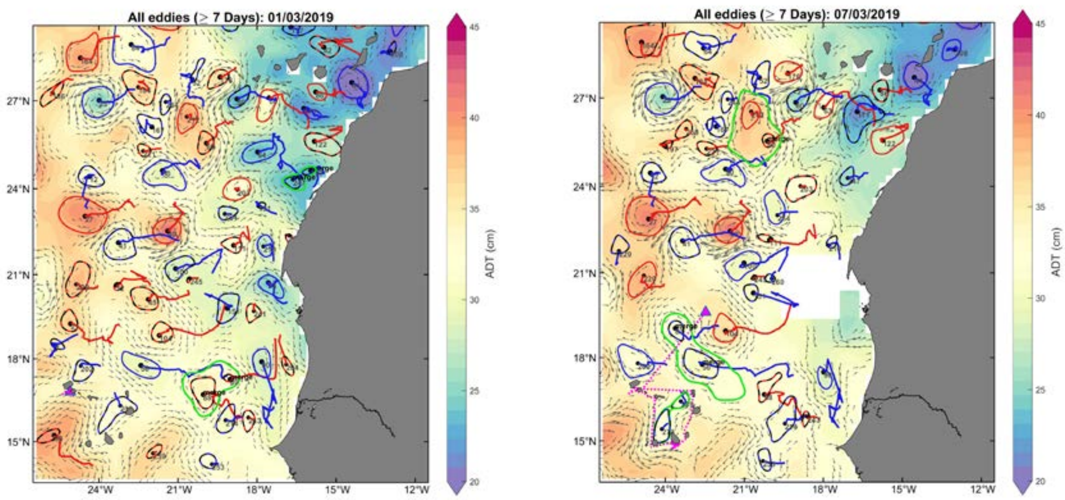

Figure 5.4: Examples of the development of mesoscale activity during POS533 from 01st to 07th of March.

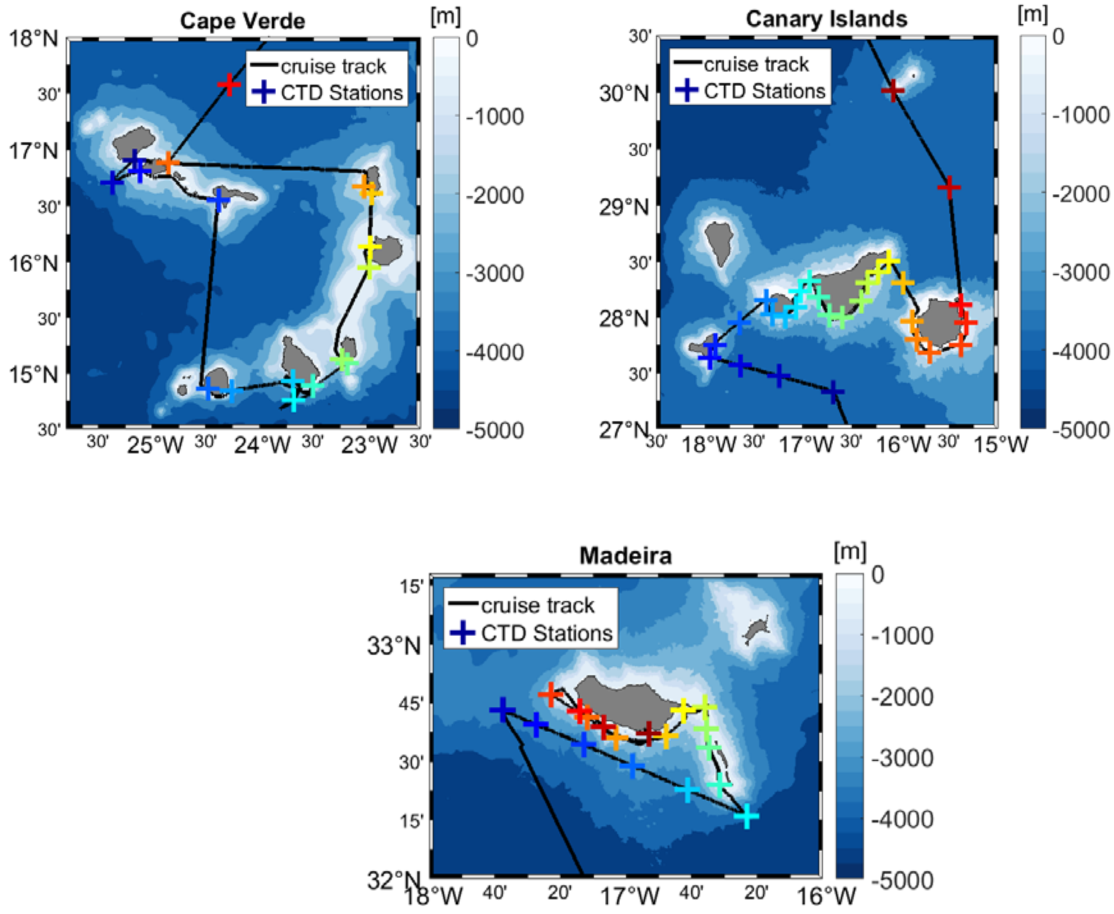

Figure 5.5: CTD-Stations at CTD-Stations at the Cap Verde, Canary Island Archipelagos and Madeira .

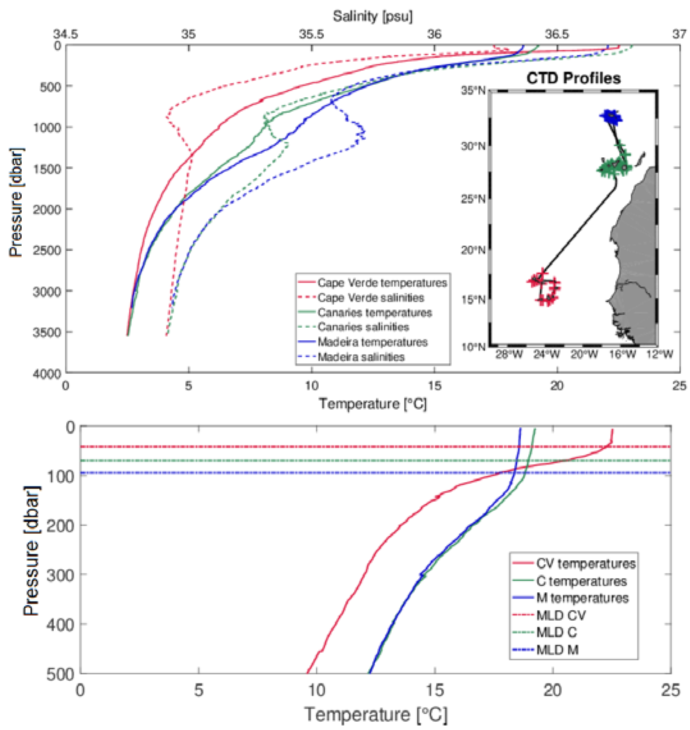

Figure 5.6: Mean temperature and salinity profiles and mixed layer depth after Lorbacher of the three Archipelagos.

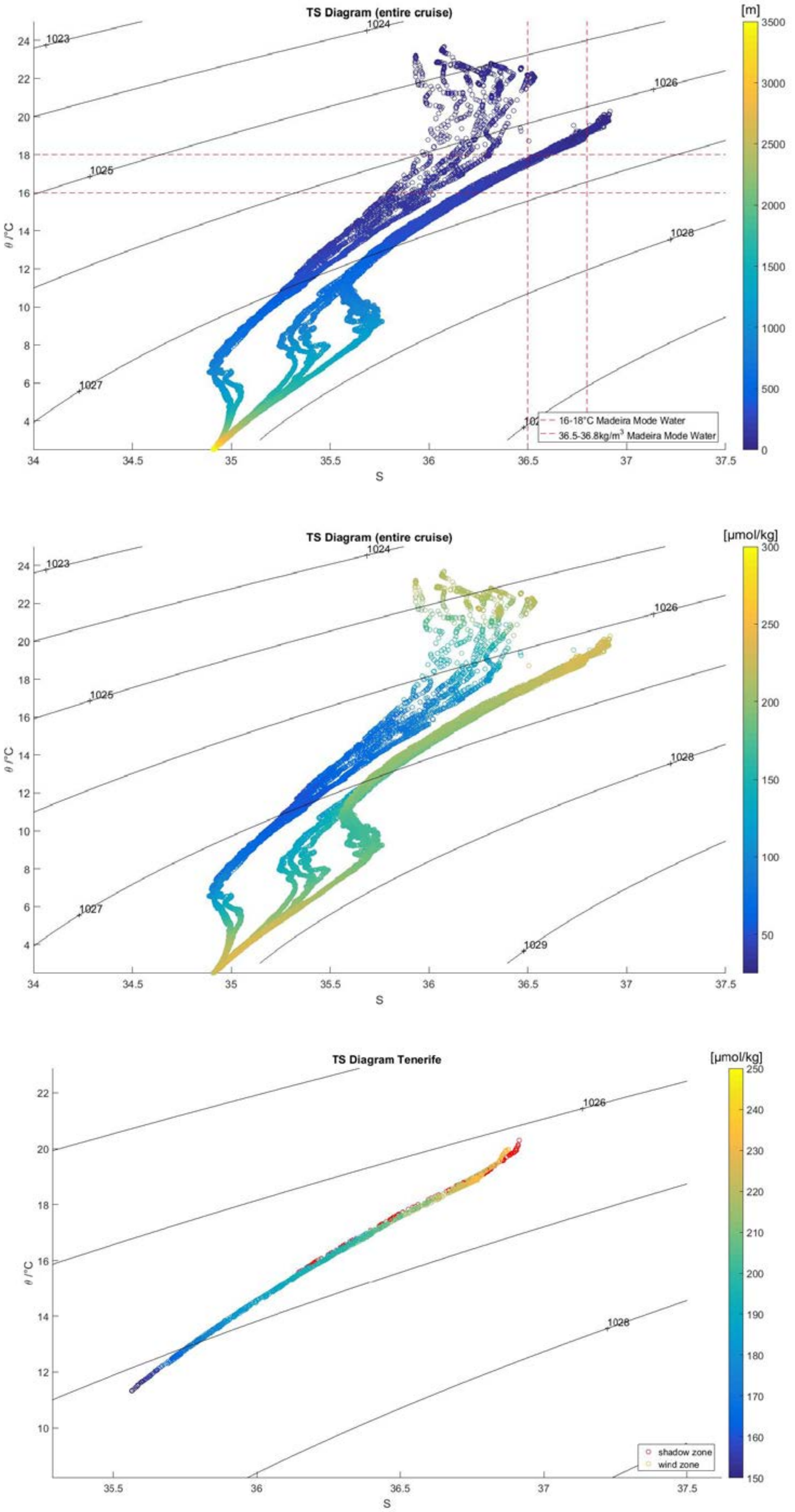

Figure 5.7: Water temperature, salinity and oxygen of deep-water profiles.

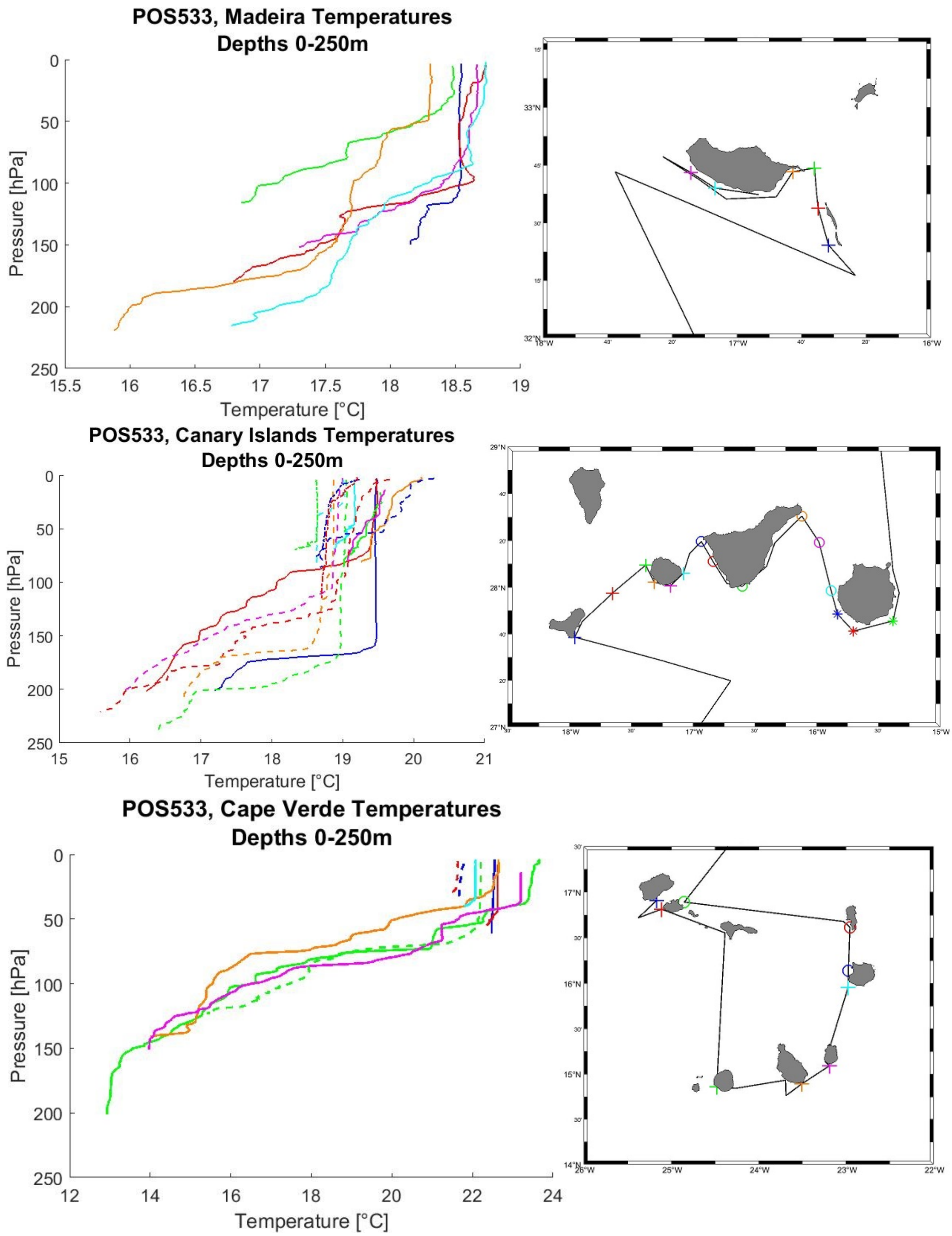

Figure 5.8: Temperate profiles of the upper 250 m of the water column at the different Archipelagos.

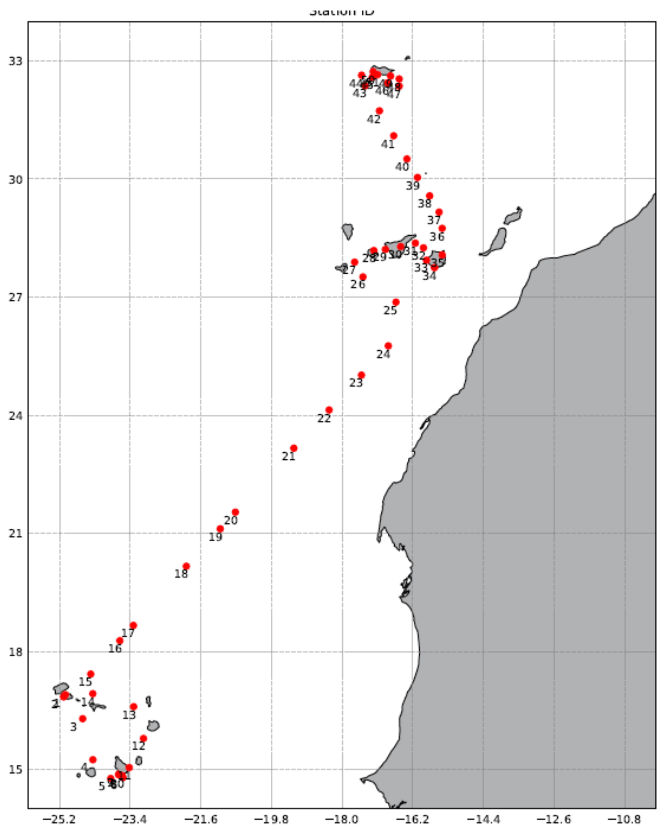

Figure 5.9: Locations of radio sonde –profiling during POS533.

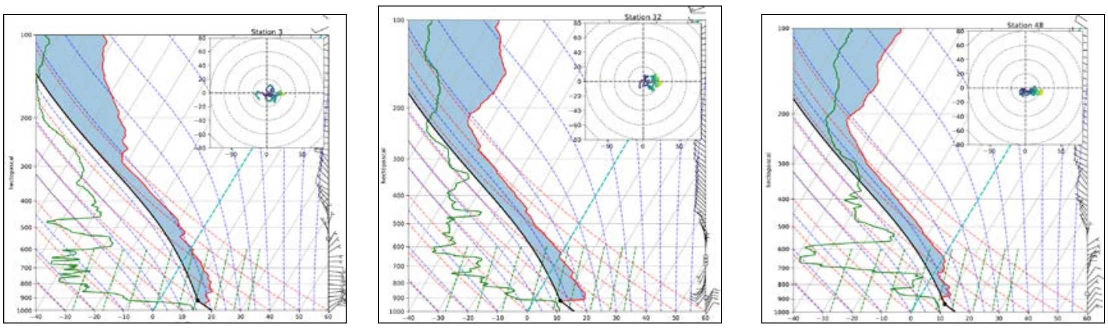

Figure 5.10: Radiosonde–profiles of temperature (red), humidity (green), parcelprofile (black) wind and position of sounding of three exemplary stations at a) Cap Verde, b) Canaries, c) Madeira.

All groups are currently working on further analysis of the samples and evaluation of the data.

5.2 Carbon chemistry

Prof. Melchor González-Dávila and Prof. J. Magdalena Santana Casiano Grupo QUIMA
Instituto de Oceanografía y Cambio Global Universidad de Las Palmas de Gran Canaria

The QUIMA group from the University of Las Palmas de Gran Canaria (ULPGC) has participated in the AIMAC project measuring variables related with the CO_2 system together with the dissolved oxygen concentration. In this initial report we show the area of study, the stations selected and the variables sampling in the Macaronesian region. The samples were analysed onboard.

SAMPLING

CTD sampling. A total of 65 CTD stations were selected in order to study the CO_2 system. Samples were taken for:

- Total alkalinity (A_T)
- Dissolved inorganic carbon (C_T)
- Dissolved oxygen concentration (O_2)

Surface continuous sampling

- A_T and C_T using the CARBOTHECA sampler
- pH using a UV-Vis pHmeter

AREAS SAMPLED AND STATIONS

Cape Verde islands: In total 17 stations were sampled including CVOO and 123 samples were measured for A_T and C_T using a VINDTA system and O_2 using a potentiometric endpoint Winkler.

Canary Islands: In total 26 stations were sampled including ESTOC and 187 samples measured for A_T and C_T and O_2.

Madeira*:* In total 16 stations were sampled including ridge M, Islas Salvages and Desertas and 123 samples measured for A_T and C_T and O_2.

- **Surface AT and CT with the CARBOTHECA***:* In total 192 samples were analysed.

METHODOLOGY

Total dissolved inorganic carbon and total alkalinity.

The total dissolved inorganic carbon (C_T) and total alkalinity (A_T) were determined with a VINDTA 3C system (Marianda, Germany) that used coulometer in order to determine the total dissolved inorganic carbon and differential potentiometric for the total alkalinity (Mintrop, 2004, Dickson et al., 2007). The certified reference material for oceanic CO2, CRMs batch #177 was used to test the performance of both the total inorganic carbon and total alkalinity, resulting in a precision of ± 1.0 μ mol kg^{-1} for both parameters.

$pH_{T,is}$

The pH was measured on the total scale at *in situ* temperature ($pH_{T,is}$) by the UV-Vis spectrophotometric technique (Clayton and Byrne, 1993) that used m-cresol purple as an indicator (González-Dávila et al., 2003). The standard deviation for the measurements was ± 0.002.

pCO_2 and saturation state for aragonite and calcite

The computation of pCO_2 and the saturation state for aragonite and calcite was done by using the CO2sys.xls v12 programme (Lewis, E. D. and Wallace, 1998) and the set of constants of Mehrbach et al. (1973) as in Dickson and Millero (1987).

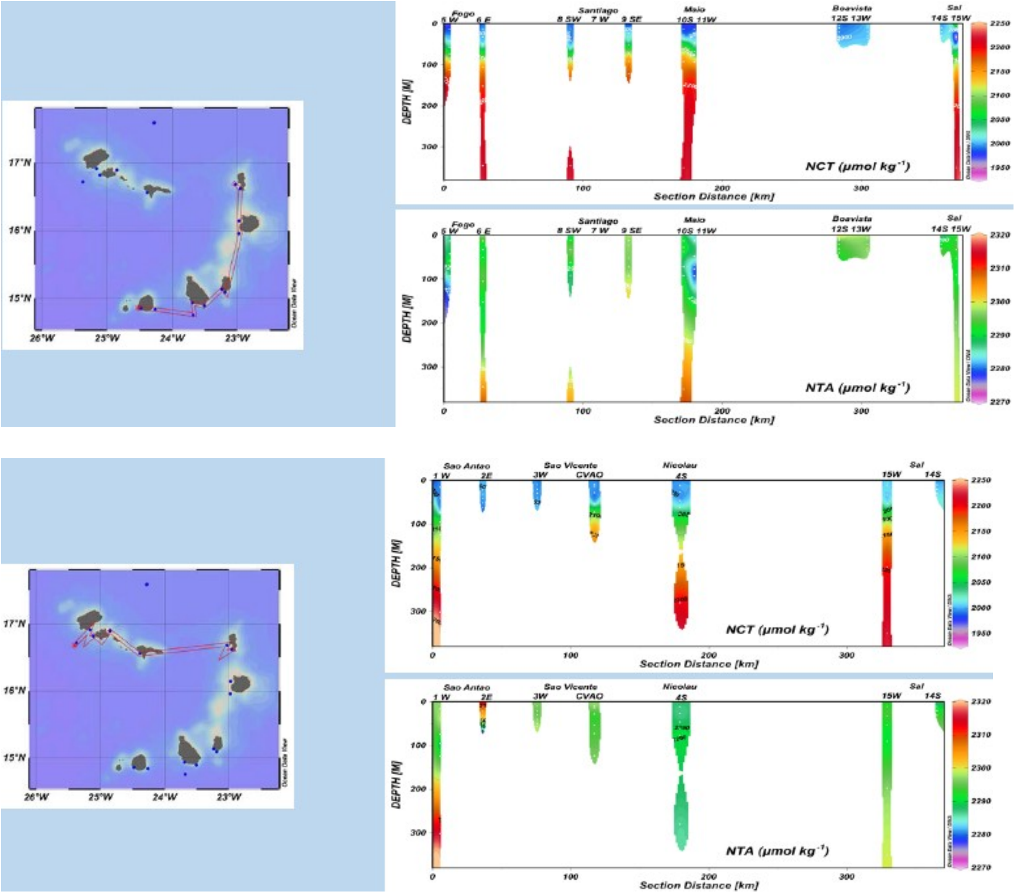

Figure 5.11: Normalized total Alkalinity (AT) and total carbon (CT) are shown for stations in Cape Verde.

Dissolved oxygen

The Winkler method was used for the determination of dissolved oxygen in seawater following WOCE methodology (after Dickson 2010 report). A 100 ml glass samples with a known volume (accuracy ± 0.01 ml) was used. During sampling, temperature for each sample was measured to account for volume changes. Dissolved oxygen was fixed by adding 1 ml of reagent 1 and 2 for oxygen, shacked vigorously and allowed to rest for over 6 hours. 1 ml 6M sulphuric acid was added and the solution titrated until potentiometric end point determination with tiosulphate previously titrated again a standard iodate solution. Results are expressed as µmol kg^{-1} ofseawater.

PREELIMINARY RESULTS

Normalized AT and CT are shown for the first set of stations in Cape Verde.

5.3 Fe Biochemistry

Prof. J. Magdalena Santana Casiano and Prof. Melchor González-Dávila Grupo QUIMA
Instituto de Oceanografía y Cambio Global Universidad de Las Palmas de Gran
Canaria

The QUIMA group from the University of Las Palmas de Gran Canaria (ULPGC) has participated in the AIMAC project measuring variables related with the iron biochemistry. In order to characterize the iron chemistry in the Macaronesian region, Fe(II) kinetics oxidation studies and Fe and Cu Complexation studies have been considered.

AREA OF STUDY AND STATIONS SELECTED

Cape Verde islands
A total of 9 stations were selected including CVOO.

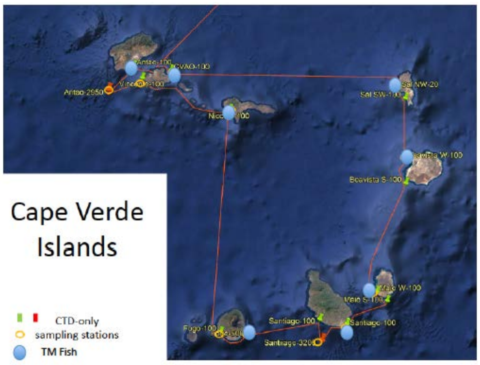

Table 1: Variables samples at Cape Verde Islands and CVOO stations.

Station	CTD	kFe	ccFe	ccCu	FeT	Date
Antao	1	X	X	X	X	28-2-19
Nicolau	4	X	X	X	X	1-3-19
Fogo	6	X	X	X	X	1-3-19
Santiago SE	9	X	X	X	X	3-3-19
Maio W	11	X	X	X	X	3-3-19
Bonita W	13	X	X	X	X	4-3-19
Sal SW	14	X	X	X	X	4-3-19
CVAO	16	X	X	X	X	5-3-19
CVOO	17	X	X	X	X	5-3-19

Canary Islands
11 stations were selected including ESTOC.

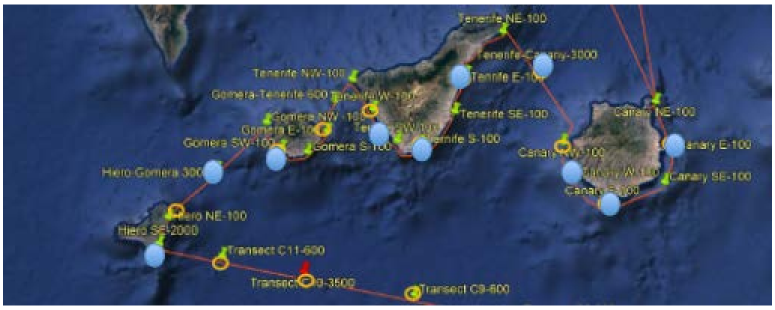

Table 2: Canary Islands and ESTOC stations and variables sampled.

Station	CTD	kFe	ccFe	ccCu	FeT	Date
Hierro SE	21	X	X	X	X	10-3-19
Hierro-Gomera	23	X	X	X	X	10-3-19
Gomera SW	25	X	X	X	X	11-3-19

Tf SW	31	X	X	X	X	12-3-19
Tf S	32	X	X	X	X	12-3-19
Tf E	34	X	X	X	X	13-3-19
Tf-GC	37	X	X	X	X	13-3-19
GC W	39	X	X	X	X	13-3-19
GC S	40	X	X	X	X	14-3-19
GC E	42	X	X	X	X	15-3-19
ESTOC	44	X	X	X	X	15-3-19

Madeira
In total, 5 stations were selected including Ridge M, Islas Salvages and Desertas

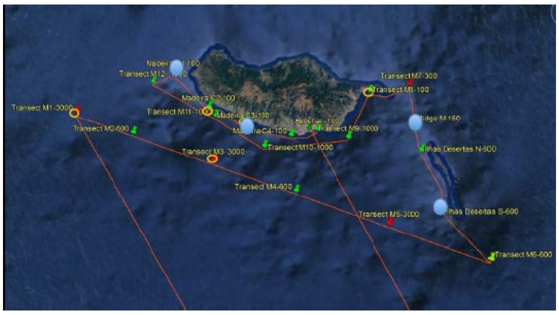

Table 3: Madeira, Islas Desertas and Salvages stations and variables sampled

Station	**CTD**	**kFe**	**ccFe**	**ccCu**	**FeT**	**Date**
Selvagens	45	X	X	X	X	16-3-19
Ilhas Desertas	52	X	X	X	X	18-3-19
Ridge M	54	X	X	X	X	18-3-19
Madeira C1	61	X	X	X	X	19-3-19
Madeira C2	63	X	X	X	X	19-3-19

SAMPLING
A total of 25 stations were selected in order to study the Biogeochemical Cycle of iron in coastal surface waters. Samples were taken for:

- Fe(II) kinetics oxidation studies (1L)
- Fe and Cu Complexation studies (250 ml x duplicate)
- Determination of dissolved iron concentration (125 ml)

The samples are being analysed on land in the QUIMA lab.

METHODOLOGY
Each sampling was carried out at 20 m depth from surface seawater. The samples were taken using a Teflon pump with a 40 m Teflon tube with a 0.22 µm AcroPack filter. LDPE bottles were used and the samples were store in a -20ºC Fridge.

All the samples will be processed in a Class 100 clean laboratory for trace metal analysis (QUIMA-IOCAG TM lab) following GEOTRACES protocol.

Fe(II) oxidation kinetics studies

Dissolved, colloidal and labile phases of Fe(II) are determined and expressed as TdFe(II). In order to determine the concentration of TdFe(II) in seawater the FeLume system (Waterville Analytical) is used. The FIA-chemiluminescence technique uses luminol as the reagent to analyse TdFe(II) (King et al., 1995).

The kinetics studies are carried out in a thermo-regulated cell connected to a thermostatic bath (PolyScience). For theses studies, 60 mL of seawater samples are used. The initial concentration of added TdFe(II) is 0.97 nM. Fe(II) concentrations of 15 nM are also used for those kinetics studies where the oxidation rate was quick and the $t_{1/2}$ was lower than 1.5 min. All studies are done in the dark. The seawater is placed in the glass cell, bubbled with pure air and the magnetic stirrer is switched on for 1 h to reach the oxygen concentration equilibrium. When the solution is tempered and the pH stable at the desired value, the sample hose is introduced into the cell. After that, the iron stock was added and the stopwatch is started simultaneously at time 0 s.

In the FIA system, four hoses are used and placed in a peristaltic pump (Rainin Dynamax 15.8 V), which connects them to the mixing chamber and to the detector. Subsequently, the pressure is regulated in the hoses while Milli-Q water passes through it. This allows the flow to be uniform and not in pulses. After adjusting the pressure in the hoses, the water cleaning mode was enabled during 3 min. After this time, air was allowed to pass and then each hose was introduced into the corresponding receptacles: luminol, NaCl, Milli-Q water and sample. The software executed in the FeLume-chemiluminescence was provided by Waterville analytical (WA control V105, photo counter control). An analysis time of 100 s is selected, to allow full recording of the peak signal. The peak area mode is selected in order to compute the signal. Three measurements for each sample are carried out and values are presented as average values. After a set of analyses, Milli-Q water is used to clean all hoses, and finally air is run to empty them.

The rates of oxidation of Fe(II) (Santana-Casiano et al., 2005) are expressed as an apparent oxidation rate, kapp (M min^{-1})

$$\frac{d[Fe(II)]}{dt} = -k_{app}[Fe(II)][O_2]$$

The brackets denote the total molar concentration. The oxygen concentration is calculated using the Benson and Krause (1984) equation. In aerate solutions, the Fe(II) kinetic studies followed a pseudo-first-order, k' (min^{-1})

$$\frac{d[Fe(II)]}{dt} = -k'[Fe(II)]$$

where $k' = k_{app}[O_2]$.

Fe complexation studies

Dissolved Fe (dFe), labile Fe (Fe′; all the inorganic species predominantly in the form $Fe(OH)_3$), and dFe-binding ligands (LFe) concentrations will be determined by differential pulse cathodic stripping voltammetry, DP-CSV (Croot and Johansson, 2000) using a Epsilon CGME voltammeter.

- Labile Fe is measured in 10 mL seawater samples by adding 100 µL of EPPS (final concentration 10 mM EPPS buffered to pH 8.05) and 10 µL of 0.01 M TAC (final concentration 10 µM). Samples are purged for 120 s with dry nitrogen gas. A new Hg drop was formed at the end of the purging time. The Teflon vials are conditioned 5 times with SW_I (UV irradiated seawater). The labile Fe concentrations are determined using the method of standard additions. TAC is added at the beginning of the purging time, the contact time is 120 s.

- Dissolved Fe concentrations are measured following the same method, but the samples are previously UV-irradiated during 4 h in quartz tubes. These tubes were soaked for one day in 10% HCl (suprapure, VWR) and washed with MQ water 5 times prior to use. They are also rinsed one more time with SW_I. The Teflon vials are conditioned 5 times with SW_I. The dFe concentration is determined using the method of standard additions. TAC is also added at the beginning of the purging time and the contact time was 180 s.

- The dFe-binding capacities of the samples are measured following the next protocol. In a series of 14 Teflon bottles an aliquot of 10 mL of natural seawater, 100 µL of EPPS (1 M) buffered to pH 8.05, and different concentrations of dFe (from 0 to 15 nM) are pipetted into the bottles. For SW titrations, the solution was left to equilibrate for 1 h. Then, 10 µL of TAC (0.01 M) are added and left to equilibrate overnight (Croot and Johansson, 2000). The samples are measured in a Teflon cell. First, two SW subsamples were systematically analysed according to the recommendation of the GEOTRACES program, where two +0-dFe additions in the titration with at least eight dFe additions, for a total of 10 or more titration points will provide a better data interpretation (Garnier et al., 2004; Gledhill and Buck, 2012; Sander et al., 2011).

The voltammetry analysis is always the same for all the analysis. During 120 s a deposition potential of −0.40 V is applied. The sample is stirred during the deposition time. At the end of the deposition time, the scan as a DP-CSV is applied with a modulation time of 0.01 s, interval time 0.1 s, initial potential −0.4 V, final potential −0.9 V, step potential 2.55 mV and modulation amplitude 49.95 mV.

Cu determination

Dissolved Cu (dCu), labile Cu (Cu′; all the inorganic species predominantly in the form Cu(II)), and dCu-binding ligands (LCu) concentrations will be determined by differential pulse cathodic stripping voltammetry, DP-CSV (Campos and van den Berg, 1994) using a Epsilon CGME voltammeter.

Total dissolved copper was determined by CSV (Cathodic stripping voltammetry) in the presence of 20 µM SA (Salicylaldoxime) in UV-seawater and seawater, after addition of 100 µL of EPPS buffer to adjust the pH to 8.2.

The DPSV conditions were: deposition potential at -50 mV for 60 sec, quiet time for 10 sec, initial potential at -150 mV and final potential at -600 mV. The step was 4 mV, pulse width of 35 ms, pulse period of 200 ms and pulse amplitude of 50 mV.

The concentration of Cu-binding ligands in the solution was also determined by CSV with ligand competition against SA (Campos and van den Berg, 1994). In this method,10 mL of the seawater samples were transferred into 20 mL Teflon vials (Savilex), each with 100 µL of EPPS buffer and 10 µL SA. Cu additions ranged from 0 (by duplicate) 12 nM. Each titration was prepared for 15 addition points. The solutions were equilibrated overnight (for a minimum of 8 h). The DPSV conditions were the same as previously described.

Complexation data for Fe and Cu were interpreted by using the ProMCC software (Omanović et al., 2015).

RESULTS

- Fe(II) kinetics studies

The kinetics experiments have been done for each UV-irradiated and non irradiated seawater sample. The Fe(II) oxidation kinetics have been study as a function of pH (8.1, 8, 7.9 and 7.8) and the temperature (10, 15, 20 and 25). In general, it is observed an increase of the rate constant with the pH and the temperature, but the slope of the dependence changes with the stations. We are currently working with the data

- Fe Complexing capacity studies: 80% of the studies have been done.
- Cu Complexing capacity studies: The studies have been done. We are working the data.

5.4 Trace gases during the cruise

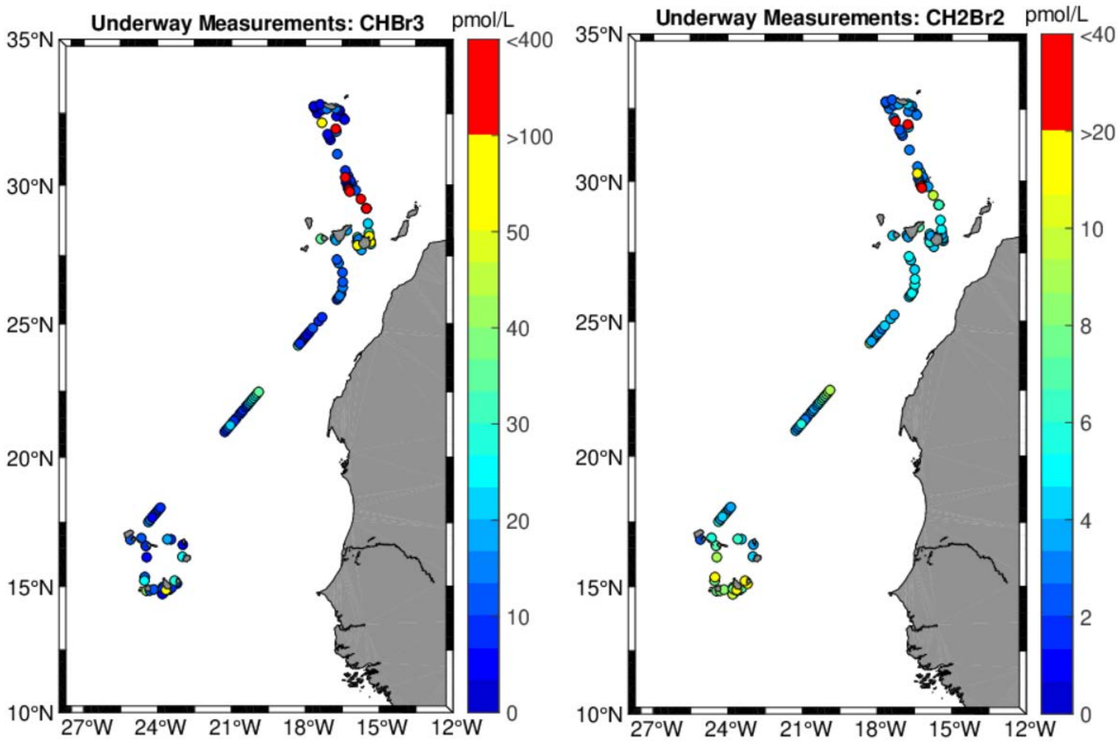

Figure 5.12: Surface concentrations of bromoform ($CHBr_3$) and dibromomethane (CH_2Br_2) during POS533.

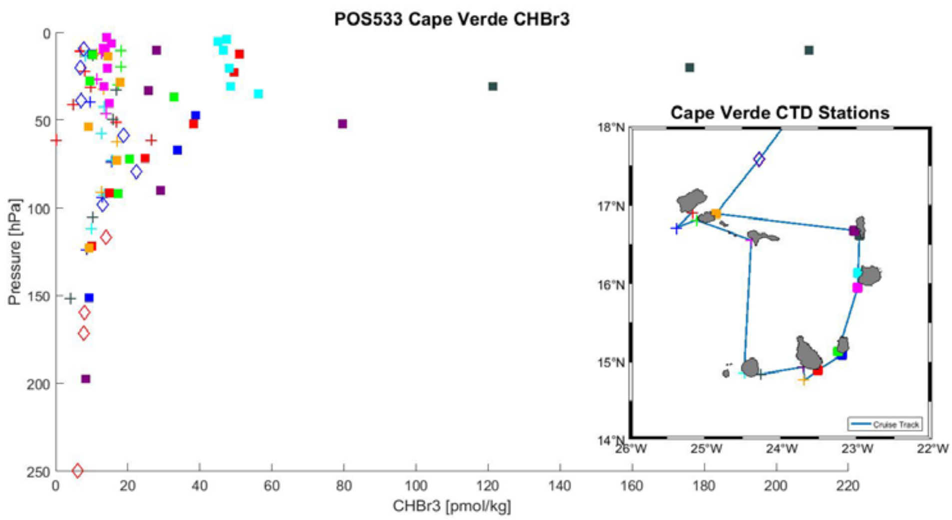

Figure 5.13: Depth profiles of bromoform ($CHBr_3$) at stations at the Cape Verde Islands.

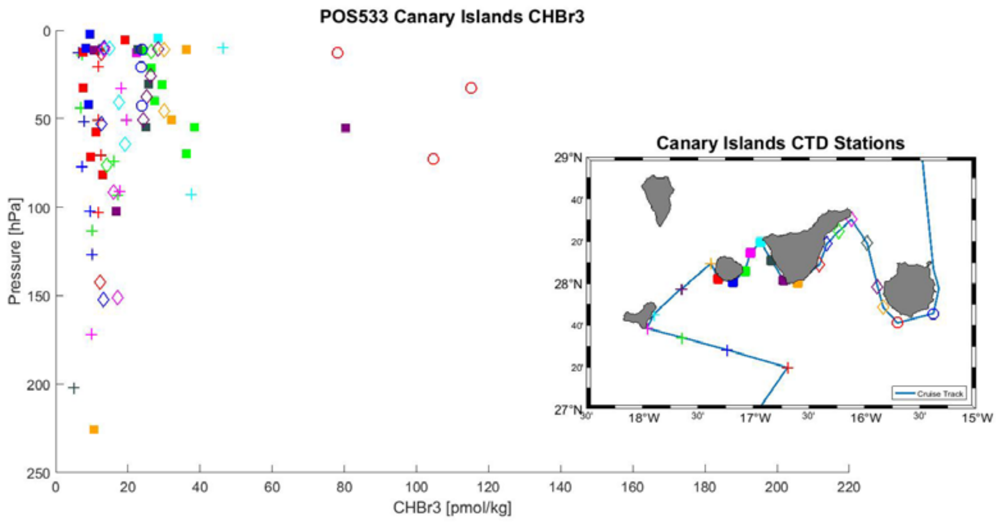

Figure 5.14: Depth profiles of bromoform ($CHBr_3$) at stations at the Canary Islands.

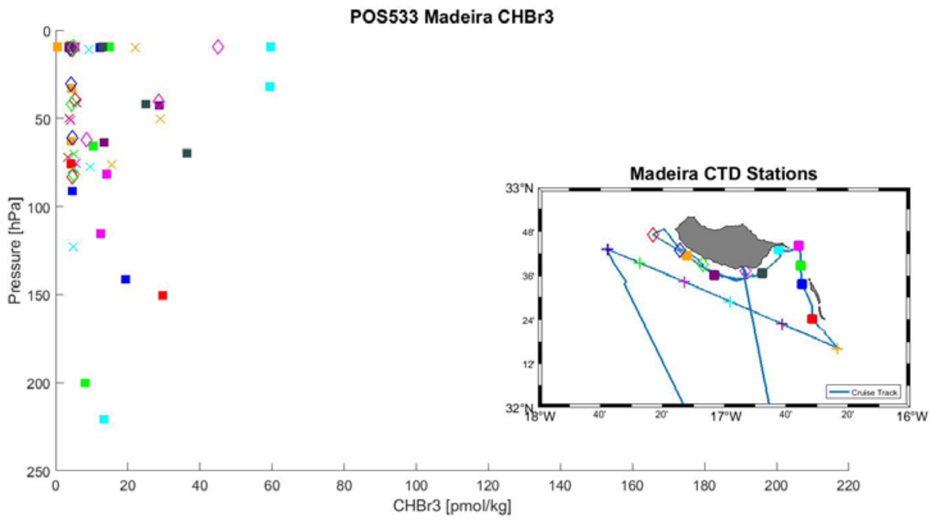

Figure 5.15: Depth profiles of bromoform ($CHBr_3$) at stations at Madeira.

5.5 Expected results

The comprehensive biogeochemical data set of phytoplankton, microbiology, trace gases, carbon, oxygen and nutrient cycling from this region will deliver more data in 2020 and will be analysed for variabilities between the Archipelagos and differences between and exchange of the shelf waters close to the islands with the open ocean. Lee and luv conditions and influences of the islands of the open ocean will be determined.

6 Ship's Meteorological Station

Not applicable

7 Station List POS533

7.1 Overall Station List

GEOMAR			Ship-stations									
St. No.	Cast	Station-Name	Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Wind Dir	Wind Velocity	Comment
			POS533_1-1	28.02.2019 12:04	Balloon	information	16° 54,576' N	025° 05,035' W	320.8	50.4	14	
			POS533_2-1	28.02.2019 12:58	Micro Structure Sonde	in the water	16° 54,733' N	025° 10,086' W	58.3	54.6	15.6	
			POS533_2-1	28.02.2019 13:02	Micro Structure Sonde	on deck	16° 54,718' N	025° 10,079' W	59	51.3	13.9	
			POS533_2-2	28.02.2019 13:08	Micro Structure Sonde	in the water	16° 54,688' N	025° 10,084' W	60.4	44.2	13.9	
			POS533_2-2	28.02.2019 13:10	Micro Structure Sonde	on deck	16° 54,686' N	025° 10,075' W	61.4	44.9	14.2	
			POS533_2-3	28.02.2019 13:14	Trace Metal Fish	in the water	16° 54,667' N	025° 10,058' W	63	47.3	13	
			POS533_2-3	28.02.2019 13:32	Trace Metal Fish	on deck	16° 54,542' N	025° 10,047' W	73.4	52.3	14	
			POS533_2-4	28.02.2019 13:48	Trace Metal Fish	in the water	16° 54,738' N	025° 10,016' W	60.9	46.4	14.9	
			POS533_2-4	28.02.2019 14:00	Trace Metal Fish	on deck	16° 54,687' N	025° 09,982' W	65.4	55.2	14.4	
St 1	1	Antao-100	POS533_2-5	28.02.2019 14:07	CTD	in the water	16° 54,652' N	025° 09,976' W	68	46.5	14	
			POS533_2-5	28.02.2019 14:16	CTD	max depth/on	16° 54,635' N	025° 09,958' W	70.5	44.4	15.7	SLmax = 60 m
			POS533_2-5	28.02.2019 14:27	CTD	on deck	16° 54,606' N	025° 09,930' W	74.4	45.7	15.4	
			POS533_3-1	28.02.2019 17:32	Micro Structure Sonde	in the water	16° 43,378' N	025° 22,672' W	2996.3	57.2	14.4	
			POS533_3-1	28.02.2019 17:42	Micro Structure Sonde	on deck	16° 43,253' N	025° 22,666' W	3024.9	61.4	13.5	
St 2	1	Antao-3000	POS533_3-2	28.02.2019 17:54	CTD	in the water	16° 43,189' N	025° 22,643' W	3049.1	68.3	15.1	
			POS533_3-2	28.02.2019 18:49	CTD	max depth/on	16° 43,030' N	025° 22,570' W	3082	61.7	12.3	SL max = 3039m
			POS533_3-2	28.02.2019 19:44	CTD	on deck	16° 42,868' N	025° 22,416' W	3043.7	68	15.4	
St 3	1	Vincente-100	POS533_4-1	28.02.2019 22:57	CTD	in the water	16° 48,824' N	025° 06,693' W	62.3	51.6	10.9	
			POS533_4-1	28.02.2019 23:05	CTD	max depth/on	16° 48,818' N	025° 06,719' W	62.9	57	8.3	53 m max
			POS533_4-1	28.02.2019 23:14	CTD	on deck	16° 48,816' N	025° 06,690' W	62	61	13.8	
			POS533_4-2	28.02.2019 23:30	Balloon	information	16° 48,789' N	025° 06,699' W	63.9	44.5	13.1	Launched
			POS533_5-1	01.03.2019 07:12	Micro Structure Sonde	in the water	16° 33,311' N	024° 23,156' W	718.2	54.8	9.5	
			POS533_5-1	01.03.2019 07:19	Micro Structure Sonde	on deck	16° 33,214' N	024° 23,141' W	740.5	41.6	12	
			POS533_5-2	01.03.2019 07:21	Trace Metal Fish	in the water	16° 33,191' N	024° 23,119' W	744.1	35.2	11.2	
			POS533_5-2	01.03.2019 07:32	Trace Metal Fish	on deck	16° 33,090' N	024° 23,028' W	758.4	47.2	8.3	
St 4	1	Nicolau-100	POS533_5-3	01.03.2019 07:42	CTD	in the water	16° 33,339' N	024° 23,156' W	705.5	49.5	8.7	
			POS533_5-3	01.03.2019 08:00	CTD	max depth/on	16° 33,340' N	024° 23,125' W	700.5	36.1	10.4	SL max = 680m
			POS533_5-3	01.03.2019 08:20	CTD	on deck	16° 33,354' N	024° 23,125' W	694.5	39.9	7.4	
			POS533_6-1	01.03.2019 11:34	Balloon	information	16° 05,798' N	024° 25,520' W	3777.5	59.4	13.5	Launched
			POS533_7-1	01.03.2019 20:45	Micro Structure Sonde	in the water	14° 51,409' N	024° 28,794' W	590.7	180.2	1.9	
			POS533_7-1	01.03.2019 20:56	Micro Structure Sonde	on deck	14° 51,442' N	024° 28,810' W	594.1	174.6	1.6	
St 5	1	Fogo-100	POS533_7-2	01.03.2019 20:59	CTD	in the water	14° 51,458' N	024° 28,816' W	601.2	150.4	1.4	
			POS533_7-2	01.03.2019 21:11	CTD	max depth/on	14° 51,513' N	024° 28,836' W	609.3	169.9	1.6	200 m max
			POS533_7-2	01.03.2019 21:22	CTD	on deck	14° 51,577' N	024° 28,856' W	504.2	148.2	1.8	
			POS533_8-1	01.03.2019 23:34	Balloon	information	14° 48,576' N	024° 18,806' W	869.5	44.4	19.8	Launched
			POS533_9-1	02.03.2019 00:28	Micro Structure Sonde	in the water	14° 50,815' N	024° 15,966' W	1286.3	15.1	16.9	
			POS533_9-1	02.03.2019 00:39	Micro Structure Sonde	on deck	14° 50,691' N	024° 15,880' W	1359.4	11.1	15.4	
			POS533_9-2	02.03.2019 00:40	Trace Metal Fish	in the water	14° 50,666' N	024° 15,872' W	1377	14.2	15.8	
			POS533_9-2	02.03.2019 00:50	Trace Metal Fish	on deck	14° 50,594' N	024° 15,814' W	1387.4	17.6	16.3	
St 6	1	Fogo-500	POS533_9-3	02.03.2019 00:57	CTD	in the water	14° 50,590' N	024° 15,777' W	1438	12.3	17.4	
			POS533_9-3	02.03.2019 01:09	CTD	max depth/on	14° 50,515' N	024° 15,695' W	1520.6	12.2	15.3	SLmax = 500m
			POS533_9-3	02.03.2019 01:29	CTD	on deck	14° 50,265' N	024° 15,517' W	1624.3	8.5	16.5	
St 7	1	Santiago W-100	POS533_10-1	02.03.2019 07:01	CTD	in the water	14° 55,994' N	023° 41,536' W	719.5	40.1	6.1	
			POS533_10-1	02.03.2019 07:16	CTD	max depth/on	14° 56,027' N	023° 41,469' W	681.7	65.1	7.6	SL max = 640m
			POS533_10-1	02.03.2019 07:29	CTD	on deck	14° 56,063' N	023° 41,434' W	650.2	70.2	9.6	
			POS533_11-1	02.03.2019 09:07	Micro Structure Sonde	in the water	14° 45,909' N	023° 41,214' W	3261.3	56.1	13.3	
			POS533_11-1	02.03.2019 09:25	Micro Structure Sonde	on deck	14° 45,814' N	023° 41,186' W	3264.9	63.3	13.2	
St 8	1	Santiago-3200	POS533_11-2	02.03.2019 09:29	CTD	in the water	14° 45,799' N	023° 41,195' W	3260.9	60.9	13.6	
			POS533_11-2	02.03.2019 10:25	CTD	max depth/on	14° 45,639' N	023° 41,087' W	3311.4	57	14.8	3050 m max
			POS533_11-2	02.03.2019 11:26	CTD	on deck	14° 45,370' N	023° 40,777' W	3291.6	58.8	14	
			POS533_11-3	02.03.2019 10:35	Balloon	information	14° 45,619' N	023° 41,032' W	3262.1	52.5	15.6	Launched
			POS533_12-1	02.03.2019 19:34	Balloon	information	14° 48,974' N	023° 31,841' W	2471.6	31	9.6	launched
			POS533_13-1	02.03.2019 22:33	Balloon	information	14° 54,402' N	023° 46,566' W	2530.3	0	0	Launched
			POS533_14-1	03.03.2019 03:50	Balloon	information	14° 48,767' N	023° 32,023' W	215.2	0	0	Launched
			POS533_15-1	03.03.2019 06:30	Balloon	information	14° 54,267' N	023° 46,545' W	2567.3	208.1	1.5	Launched
			POS533_16-1	03.03.2019 11:39	Balloon	information	14° 48,928' N	023° 31,818' W	2470.4	29.5	12.8	launched
			POS533_17-1	03.03.2019 14:32	Balloon	information	14° 54,321' N	023° 46,713' W	2581.1	260.1	5.1	Launched
			POS533_18-1	03.03.2019 17:42	Micro Structure Sonde	in the water	14° 53,521' N	023° 30,559' W	101.8	48.5	8.7	
			POS533_18-1	03.03.2019 17:47	Micro Structure Sonde	on deck	14° 53,500' N	023° 30,518' W	128.1	21.5	10.8	
			POS533_18-2	03.03.2019 17:49	Trace Metal Fish	in the water	14° 53,486' N	023° 30,492' W	143.2	32.7	9.1	
			POS533_18-2	03.03.2019 17:57	Trace Metal Fish	on deck	14° 53,480' N	023° 30,447' W	153	34.9	7.6	
St 9	1	SantiagoSE-100	POS533_18-3	03.03.2019 17:59	CTD	in the water	14° 53,476' N	023° 30,430' W	176.7	26.5	10.8	
			POS533_18-3	03.03.2019 18:05	CTD	max depth/on	14° 53,487' N	023° 30,410' W	166.1	26	8.5	SL max = 140m
			POS533_18-3	03.03.2019 18:13	CTD	on deck	14° 53,501' N	023° 30,413' W	151.1	18.1	10.5	
			POS533_19-1	03.03.2019 21:23	Micro Structure Sonde	in the water	15° 05,585' N	023° 11,359' W	317.2	27.9	8.1	
			POS533_19-1	03.03.2019 21:29	Micro Structure Sonde	on deck	15° 05,571' N	023° 11,343' W	318.9	37.8	7.2	
Stt 10	1	Maio S-100	POS533_19-2	03.03.2019 21:32	CTD	in the water	15° 05,559' N	023° 11,341' W	320.1	29.3	9.2	
			POS533_19-2	03.03.2019 21:38	CTD	max depth/on	15° 05,543' N	023° 11,343' W	311.2	28.2	9.3	150 m max
			POS533_19-2	03.03.2019 21:48	CTD	on deck	15° 05,536' N	023° 11,324' W	320.1	33.1	9.3	
			POS533_20-1	03.03.2019 22:51	Micro Structure Sonde	in the water	15° 07,960' N	023° 14,257' W	417.2	20.6	8.1	
			POS533_20-1	03.03.2019 23:00	Micro Structure Sonde	on deck	15° 07,967' N	023° 14,258' W	405.9	27.3	8.9	
			POS533_20-2	03.03.2019 23:01	Trace Metal Fish	in the water	15° 07,968' N	023° 14,257' W	404.9	24.5	9.3	
			POS533_20-2	03.03.2019 23:11	Trace Metal Fish	on deck	15° 07,980' N	023° 14,234' W	399.9	13.8	7.8	
St 11	1	Maio W-100	POS533_20-3	03.03.2019 23:14	CTD	in the water	15° 07,991' N	023° 14,225' W	382.7	18.9	7	
			POS533_20-3	03.03.2019 23:24	CTD	max depth/on	15° 07,976' N	023° 14,225' W	401.2	22	9.1	350 m max
			POS533_20-3	03.03.2019 23:39	CTD	on deck	15° 07,999' N	023° 14,179' W	353.3	10.8	8.9	
			POS533_20-4	03.03.2019 23:47	Balloon	information	15° 08,002' N	023° 14,180' W	352.6	25.3	6.4	Launched
			POS533_21-1	04.03.2019 07:48	Micro Structure Sonde	in the water	15° 57,258' N	022° 58,621' W	46.8	25.9	9	

GEOMAR			Ship-stations									
St. No.	Cast	Station-Name	Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Wind Dir	Wind Velocity	Comment
			POS533_21-1	04.03.2019 07:51	Micro Structure Sonde	on deck	15° 57,250' N	022° 58,619' W	46.9	30.7	7.7	
St 12	1	Boavista S-100	POS533_21-2	04.03.2019 07:55	CTD	in the water	15° 57,245' N	022° 58,606' W	46.5	29.3	7.9	
			POS533_21-2	04.03.2019 08:02	CTD	max depth/on	15° 57,239' N	022° 58,593' W	46.3	30	5.9	SL max = 40m
			POS533_21-2	04.03.2019 08:12	CTD	on deck	15° 57,242' N	022° 58,585' W	46.5	37.5	7.5	
			POS533_21-3	04.03.2019 08:26	CTD	in the water	15° 57,279' N	022° 58,605' W	47.6	48.3	9.2	
			POS533_21-3	04.03.2019 08:29	CTD	max depth/on	15° 57,275' N	022° 58,606' W	46.9	31.7	9.2	SL max = 40m
			POS533_21-3	04.03.2019 08:34	CTD	on deck	15° 57,282' N	022° 58,590' W	47.3	34.7	8	
			POS533_22-1	04.03.2019 11:09	Micro Structure Sonde	in the water	16° 08,519' N	022° 58,475' W	40.6	36.2	9.6	
			POS533_22-1	04.03.2019 11:12	Micro Structure Sonde	on deck	16° 08,490' N	022° 58,458' W	39.8	35.6	11.7	
			POS533_22-2	04.03.2019 11:13	Trace Metal Fish	in the water	16° 08,476' N	022° 58,448' W	40.7	48.9	12	
			POS533_22-2	04.03.2019 11:22	Trace Metal Fish	on deck	16° 08,462' N	022° 58,397' W	38.9	46.9	11.7	
St 13	1	Boavista W-100	POS533_22-3	04.03.2019 11:26	CTD	in the water	16° 08,454' N	022° 58,378' W	38	35	11.4	
			POS533_22-3	04.03.2019 11:31	CTD	max depth/on	16° 08,427' N	022° 58,347' W	38.2	44.5	11.8	32 m max
			POS533_22-3	04.03.2019 11:38	CTD	on deck	16° 08,401' N	022° 58,304' W	37.3	46.7	12.4	
			POS533_22-4	04.03.2019 11:40	Balloon	information	16° 08,391' N	022° 58,295' W	37.7	44.2	12.2	Launched
			POS533_23-1	04.03.2019 16:19	Trace Metal Fish	in the water	16° 37,012' N	022° 57,417' W	31.1	24.5	13.3	
			POS533_23-1	04.03.2019 16:28	Trace Metal Fish	on deck	16° 36,951' N	022° 57,373' W	32.2	42.3	13.5	
St 14	1	Sal SW-100	POS533_23-2	04.03.2019 16:32	CTD	in the water	16° 36,946' N	022° 57,351' W	31.7	33.3	13	
			POS533_23-2	04.03.2019 16:36	CTD	max depth/on	16° 36,910' N	022° 57,342' W	31.9	53.8	12.1	SL max = 27m
			POS533_23-2	04.03.2019 16:40	CTD	on deck	16° 36,900' N	022° 57,325' W	32	34.1	12.7	
			POS533_24-1	04.03.2019 17:41	Micro Structure Sonde	in the water	16° 40,943' N	023° 01,837' W	482.7	31.5	13	
			POS533_24-1	04.03.2019 17:56	Micro Structure Sonde	on deck	16° 40,788' N	023° 01,703' W	518.1	47.7	13.7	
St 15	1	Sal NW-100	POS533_24-2	04.03.2019 17:59	CTD	in the water	16° 40,775' N	023° 01,687' W	522.2	36.9	14.8	
			POS533_24-2	04.03.2019 18:11	CTD	max depth/on	16° 40,769' N	023° 01,702' W	527.5	49.7	12.5	SL max = 520m
			POS533_24-2	04.03.2019 18:33	CTD	on deck	16° 40,795' N	023° 01,693' W	516.1	40.8	13	
			POS533_25-1	04.03.2019 23:36	Balloon	information	16° 50,075' N	023° 29,393' W	3185.2	44.8	10.5	Launched
			POS533_26-1	05.03.2019 09:45	Micro Structure Sonde	in the water	16° 53,429' N	024° 51,082' W	89.9	42.7	9	
			POS533_26-1	05.03.2019 09:50	Micro Structure Sonde	on deck	16° 53,443' N	024° 51,095' W	106.5	45.4	8.3	
			POS533_26-2	05.03.2019 09:51	Trace Metal Fish	in the water	16° 53,449' N	024° 51,098' W	109.9	23.5	8.1	
			POS533_26-2	05.03.2019 10:02	Trace Metal Fish	on deck	16° 53,471' N	024° 51,114' W	124.5	33.7	8.8	
St 16	1	CVAO-100	POS533_26-3	05.03.2019 10:06	CTD	in the water	16° 53,486' N	024° 51,109' W	134.5	48.5	7.3	
			POS533_26-3	05.03.2019 10:13	CTD	max depth/on	16° 53,501' N	024° 51,110' W	138.5	31.7	8.4	120 m max
			POS533_26-3	05.03.2019 10:24	CTD	on deck	16° 53,510' N	024° 51,104' W	155.3	37.1	7.9	
			POS533_27-1	05.03.2019 11:29	Balloon	information	16° 58,549' N	024° 46,794' W	1872.3	30.7	8.9	Launched
			POS533_28-1	05.03.2019 19:03	Micro Structure Sonde	in the water	17° 34,973' N	024° 17,010' W	3599.2	29.7	11	
			POS533_28-1	05.03.2019 19:20	Micro Structure Sonde	on deck	17° 34,883' N	024° 16,979' W	3588.1	33.1	10.3	
			POS533_28-2	05.03.2019 19:21	Trace Metal Fish	in the water	17° 34,874' N	024° 16,976' W	3593.4	39.3	10.2	
			POS533_28-2	05.03.2019 19:31	Trace Metal Fish	on deck	17° 34,867' N	024° 16,981' W	3591.6	29.4	9.7	
St 17	1	CVOO-3200	POS533_28-3	05.03.2019 19:34	CTD	in the water	17° 34,860' N	024° 16,983' W	3590.2	31.3	10.2	
			POS533_28-3	05.03.2019 19:45	CTD	max depth/on	17° 34,896' N	024° 16,967' W	3591.3	42.1	10.9	SL max = 452m
			POS533_28-3	05.03.2019 20:07	CTD	on deck	17° 34,988' N	024° 16,961' W	3590.9	29.9	9.6	
St 17	2	CVOO-3200	POS533_28-4	05.03.2019 21:04	CTD	in the water	17° 34,954' N	024° 16,929' W	3593.2	24.5	12.3	
			POS533_28-4	05.03.2019 22:08	CTD	max depth/on	17° 35,139' N	024° 16,784' W	3596.1	34.8	10.2	3545 m max
			POS533_28-4	05.03.2019 23:22	CTD	on deck	17° 35,189' N	024° 16,583' W	3604.1	43.7	9.8	
			POS533_28-5	05.03.2019 23:38	Balloon	information	17° 35,231' N	024° 16,562' W	3594.2	32.4	8.3	Launched
			POS533_29-1	06.03.2019 11:33	Balloon	information	18° 36,382' N	023° 22,214' W	3732.6	37	12.9	Launched
			POS533_30-1	06.03.2019 23:30	Balloon	information	19° 34,304' N	022° 30,213' W	3841.3	50.9	14.3	Launched
			POS533_31-1	07.03.2019 11:30	Balloon	information	20° 26,362' N	021° 43,210' W	4052.3	60.9	11.7	Launched
			POS533_32-1	07.03.2019 23:26	Balloon	information	21° 27,768' N	020° 47,422' W	4181.9	44.6	14.2	Launched
			POS533_33-1	08.03.2019 11:29	Balloon	information	22° 25,327' N	019° 54,771' W	3921.9	58.7	10.7	Launched
			POS533_34-1	09.03.2019 00:02	Balloon	information	23° 33,054' N	018° 52,356' W	3206.3	42	9.6	Launched
			POS533_35-1	09.03.2019 11:35	Balloon	information	24° 27,907' N	018° 01,417' W	2609.1	64.2	14.2	Launched
			POS533_36-1	09.03.2019 23:36	Balloon	information	25° 16,181' N	017° 16,266' W	3100	49	16.5	Launched
			POS533_37-1	10.03.2019 11:38	Balloon	information	26° 01,302' N	016° 34,740' W	3457	59.1	12.9	Launched
			POS533_38-1	10.03.2019 23:34	Balloon	information	27° 16,919' N	016° 38,976' W	3562.9	40.2	12.5	Launched
			POS533_39-1	11.03.2019 00:14	Micro Structure Sonde	in the water	27° 20,530' N	016° 41,627' W	3574.6	39	11	
			POS533_39-1	11.03.2019 00:39	Micro Structure Sonde	information	27° 20,197' N	016° 42,078' W	3569.9	26.4	13.1	Verlust MSS
St 18	1	Trans. C9-600	POS533_39-2	11.03.2019 01:06	CTD	in the water	27° 19,920' N	016° 41,704' W	3568.6	31.2	10.1	
			POS533_39-2	11.03.2019 01:19	CTD	max depth/on	27° 19,887' N	016° 41,695' W	3577.4	30.9	9.4	SLmax = m
			POS533_39-2	11.03.2019 01:38	CTD	on deck	27° 19,815' N	016° 41,694' W	3569.5	37.2	13	
St 19	1	Trans. C10-600	POS533_40-1	11.03.2019 05:32	CTD	in the water	27° 28,471' N	017° 14,616' W	3614.3	57	5.6	
			POS533_40-1	11.03.2019 05:45	CTD	max depth/on	27° 28,476' N	017° 14,598' W	3613.3	66.8	5.1	SL max = 600m
			POS533_40-1	11.03.2019 06:02	CTD	on deck	27° 28,466' N	017° 14,561' W	3614.6	33.2	5.6	
St 20	1	Trans. C11-600	POS533_41-1	11.03.2019 09:02	CTD	in the water	27° 34,306' N	017° 38,904' W	3556.7	8	10.4	
			POS533_41-1	11.03.2019 09:17	CTD	max depth/on	27° 34,276' N	017° 38,675' W	3551.2	19.2	8.3	600 m max
			POS533_41-1	11.03.2019 09:35	CTD	on deck	27° 34,248' N	017° 38,428' W	3594.5	8.2	9.2	
			POS533_42-1	11.03.2019 11:35	Balloon	information	27° 38,261' N	017° 53,471' W	2363.5	26	13.3	Launched
			POS533_43-1	11.03.2019 12:09	Trace Metal Fish	in the water	27° 38,712' N	017° 57,527' W	625.2	34.4	13.2	
			POS533_43-1	11.03.2019 12:18	Trace Metal Fish	on deck	27° 38,635' N	017° 57,510' W	664.9	37.6	13.5	
St 21	1	Hiero SE-200	POS533_43-2	11.03.2019 12:23	CTD	in the water	27° 38,639' N	017° 57,489' W	685.5	33.2	13.8	
			POS533_43-2	11.03.2019 12:30	CTD	max depth/on	27° 38,634' N	017° 57,445' W	704.9	36.8	14.3	SLmax = 200 m
			POS533_43-2	11.03.2019 12:40	CTD	on deck	27° 38,631' N	017° 57,407' W	733.7	35.3	13.4	
St 22	1	Hierro NE 100	POS533_44-1	11.03.2019 14:58	CTD	in the water	27° 45,444' N	017° 53,870' W	688.6	33	10.5	
			POS533_44-1	11.03.2019 15:15	CTD	max depth/on	27° 45,401' N	017° 53,823' W	709.9	40	10	SLmax = 650 m
			POS533_44-1	11.03.2019 15:31	CTD	on deck	27° 45,380' N	017° 53,758' W	739.7	28.4	10.9	
			POS533_45-1	11.03.2019 19:01	Trace Metal Fish	in the water	27° 57,583' N	017° 39,209' W	3028.4	34.3	13.5	
			POS533_45-1	11.03.2019 19:10	Trace Metal Fish	on deck	27° 57,524' N	017° 39,196' W	3032.6	29.4	13.7	
St 23	1	Hierro Gom. 3000	POS533_45-2	11.03.2019 19:14	CTD	in the water	27° 57,557' N	017° 39,170' W	3025.4	36.7	14.3	
			POS533_45-2	11.03.2019 19:21	CTD	max depth/on	27° 57,523' N	017° 39,164' W	3027.4	34.3	12.9	SL max = 200m
			POS533_45-2	11.03.2019 19:31	CTD	on deck	27° 57,446' N	017° 39,140' W	3031.6	30.7	12.9	
St 23	2	Hierro Gom. 3000	POS533_45-3	11.03.2019 20:04	CTD	in the water	27° 57,624' N	017° 39,214' W	3022	31.2	15.2	
			POS533_45-3	11.03.2019 20:57	CTD	max depth/on	27° 57,399' N	017° 39,006' W	3040.8	34.3	11.5	3000 m max

GEOMAR			Ship-stations									
St. No.	Cast	Station-Name	Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Wind Dir	Wind Velocity	Comment
			POS533_45-3	11.03.2019 22:00	CTD	on deck	27° 56,874' N	017° 38,693' W	3060.4	22.6	15.1	
			POS533_46-1	11.03.2019 23:21	Balloon	information	28° 01,447' N	017° 34,038' W	2542	36.9	14.4	Launched
St 24	1	Gom. NW 100	POS533_47-1	12.03.2019 02:03	CTD	in the water	28° 09,574' N	017° 23,019' W	115.2	34.2	15.2	
			POS533_47-1	12.03.2019 02:06	CTD	max depth/on	28° 09,599' N	017° 22,992' W	90.7	31.7	16	SLmax = 80 m
			POS533_47-1	12.03.2019 02:11	CTD	on deck	28° 09,587' N	017° 22,974' W	89.5	22.4	16.9	
			POS533_48-1	12.03.2019 04:18	Trace Metal Fish	in the water	28° 02,261' N	017° 18,901' W	93.7	142.8	1.5	
			POS533_48-1	12.03.2019 04:27	Trace Metal Fish	on deck	28° 02,248' N	017° 18,927' W	95.5	135.7	1.8	
St 25	1	Gom. SW 100	POS533_48-2	12.03.2019 04:30	CTD	in the water	28° 02,246' N	017° 18,933' W	94.9	116.8	2	
			POS533_48-2	12.03.2019 04:34	CTD	max depth/on	28° 02,252' N	017° 18,941' W	95.4	97.3	1.3	SL max = 80m
			POS533_48-2	12.03.2019 04:43	CTD	on deck	28° 02,260' N	017° 18,968' W	95.6	107.9	1.3	
St 26	1	Gom. S 100	POS533_49-1	12.03.2019 06:18	CTD	in the water	28° 00,739' N	017° 11,042' W	96	254	2.5	
			POS533_49-1	12.03.2019 06:25	CTD	max depth/on	28° 00,742' N	017° 11,036' W	95.7	264.1	3.6	SL max = 80m
			POS533_49-1	12.03.2019 06:32	CTD	on deck	28° 00,749' N	017° 11,040' W	95.4	269.5	3.5	
St 27	1	Gom. E 300	POS533_50-1	12.03.2019 08:24	CTD	in the water	28° 06,003' N	017° 04,756' W	73.7	345.1	15.4	
			POS533_50-1	12.03.2019 08:28	CTD	max depth/on	28° 05,974' N	017° 04,712' W	73.6	342.3	16.4	70 m max
			POS533_50-1	12.03.2019 08:37	CTD	on deck	28° 05,951' N	017° 04,635' W	72.7	343.5	16.3	
St 28	1	Gom. Ten. 3000	POS533_51-1	12.03.2019 10:13	CTD	in the water	28° 14,402' N	017° 01,785' W	658.8	3.5	11.7	
			POS533_51-1	12.03.2019 10:28	CTD	max depth/on	28° 14,417' N	017° 01,707' W	651.4	26.5	3.9	650 m max
			POS533_51-1	12.03.2019 10:51	CTD	on deck	28° 14,306' N	017° 01,524' W	510.6	4.8	12.4	
			POS533_52-1	12.03.2019 11:25	Balloon	information	28° 15,527' N	017° 00,793' W	1018.5	4.4	12.5	Launched
St 29	1	Ten. NW 100	POS533_53-1	12.03.2019 14:50	CTD	in the water	28° 19,689' N	016° 56,045' W	97.6	34.2	7.4	
			POS533_53-1	12.03.2019 15:07	CTD	max depth/on	28° 19,808' N	016° 56,041' W	79.3	19.9	11.1	SLmax = 90 m
			POS533_53-1	12.03.2019 15:07	CTD	on deck	28° 19,809' N	016° 56,041' W	79.8	16.4	9.5	
St 30	1	Ten. W 100	POS533_54-1	12.03.2019 17:05	CTD	in the water	28° 11,099' N	016° 50,364' W	227	155.7	6.6	
			POS533_54-1	12.03.2019 17:13	CTD	max depth/on	28° 11,089' N	016° 50,376' W	223.5	160	6.1	SL max = 220m
			POS533_54-1	12.03.2019 17:24	CTD	on deck	28° 11,100' N	016° 50,368' W	218.5	165.9	6.6	
			POS533_55-1	12.03.2019 17:41	Balloon	information	28° 11,093' N	016° 50,350' W	208.5	176.6	6.3	Launched
			POS533_56-1	12.03.2019 20:02	Trace Metal Fish	in the water	28° 01,851' N	016° 43,768' W	279	202	6.3	
			POS533_56-1	12.03.2019 20:10	Trace Metal Fish	on deck	28° 01,836' N	016° 43,731' W	261	206.6	4.9	
St 31	1	Ten. SW 100	POS533_56-2	12.03.2019 20:30	CTD	in the water	28° 01,685' N	016° 43,662' W	323.7	155.7	3	
			POS533_56-2	12.03.2019 20:39	CTD	max depth/on	28° 01,613' N	016° 43,639' W	371.6	114.6	3.6	300 m max
			POS533_56-2	12.03.2019 20:53	CTD	on deck	28° 01,501' N	016° 43,587' W	431.4	104	3.5	
			POS533_57-1	12.03.2019 22:24	Trace Metal Fish	in the water	28° 00,562' N	016° 36,183' W	190.1	51.4	8.9	
			POS533_57-1	12.03.2019 22:33	Trace Metal Fish	on deck	28° 00,525' N	016° 36,171' W	222.3	55.5	6.9	
St 32	1	Ten. S 100	POS533_57-2	12.03.2019 22:37	CTD	in the water	28° 00,516' N	016° 36,148' W	228.3	53.8	7	
			POS533_57-2	12.03.2019 22:45	CTD	max depth/on	28° 00,483' N	016° 36,132' W	269	57.1	8.2	240 m max
			POS533_57-2	12.03.2019 22:56	CTD	on deck	28° 00,426' N	016° 36,127' W	318.2	54.4	7.8	
St 33	1	Ten. SE 100	POS533_58-1	13.03.2019 01:29	CTD	in the water	28° 08,961' N	016° 24,340' W	532	46.8	13	
			POS533_58-1	13.03.2019 01:39	CTD	max depth/on	28° 08,973' N	016° 24,335' W	536.1	45.9	12.4	SLmax = 500 m
			POS533_58-1	13.03.2019 01:53	CTD	on deck	28° 08,967' N	016° 24,328' W	544.5	41.5	14.1	
			POS533_59-1	13.03.2019 04:16	Trace Metal Fish	in the water	28° 18,918' N	016° 20,307' W	482.1	18.4	1.5	
			POS533_59-1	13.03.2019 04:26	Trace Metal Fish	on deck	28° 18,969' N	016° 20,340' W	468.3	23.3	1.4	
St 34	1	Ten. E 100	POS533_59-2	13.03.2019 04:31	CTD	in the water	28° 18,988' N	016° 20,357' W	467.7	54.8	1.6	
			POS533_59-2	13.03.2019 04:41	CTD	max depth/on	28° 18,962' N	016° 20,356' W	467.5	349	0.7	SL max = 450m
			POS533_59-2	13.03.2019 04:56	CTD	on deck	28° 18,895' N	016° 20,318' W	480.7	6.4	2.4	
			POS533_60-1	13.03.2019 05:32	Balloon	information	28° 20,156' N	016° 20,661' W	325.4	279.5	2.7	launched
St 35	1	Ten. Port 100	POS533_61-1	13.03.2019 06:59	CTD	in the water	28° 24,788' N	016° 13,942' W	1599.1	33.5	3.4	
			POS533_61-1	13.03.2019 07:15	CTD	max depth/on	28° 24,775' N	016° 13,925' W	1598.5	53.3	6.8	SL max = 600m
			POS533_61-1	13.03.2019 07:30	CTD	on deck	28° 24,791' N	016° 13,924' W	1610.4	9.6	2.8	
St 36	1	Ten. NE 100	POS533_62-1	13.03.2019 09:16	CTD	in the water	28° 30,458' N	016° 07,171' W	225.2	31.3	10.7	
			POS533_62-1	13.03.2019 09:21	CTD	max depth/on	28° 30,434' N	016° 07,176' W	237.6	24.4	12.1	SL max = 210m
			POS533_62-1	13.03.2019 09:31	CTD	on deck	28° 30,428' N	016° 07,116' W	252.8	33.1	11.8	
			POS533_63-1	13.03.2019 11:33	Balloon	information	28° 23,858' N	016° 01,300' W	2415.2	30.4	11	Launched
			POS533_64-1	13.03.2019 12:39	Trace Metal Fish	in the water	28° 19,217' N	015° 58,715' W	2935.4	25.9	9.1	
			POS533_64-1	13.03.2019 12:50	Trace Metal Fish	on deck	28° 19,214' N	015° 58,687' W	2940.4	28.9	9.5	
St 37	1	Ten. -G.Can. 3000	POS533_64-2	13.03.2019 12:53	CTD	in the water	28° 19,200' N	015° 58,685' W	2936.3	26.9	8.9	
			POS533_64-2	13.03.2019 13:00	CTD	max depth/on	28° 19,201' N	015° 58,653' W	2939.6	26.8	9	SLmax = 200 m
			POS533_64-2	13.03.2019 13:10	CTD	on deck	28° 19,199' N	015° 58,636' W	2939.2	29	8.3	
St 37	2	Ten. -G.Can. 3000	POS533_64-3	13.03.2019 13:45	CTD	in the water	28° 19,263' N	015° 58,789' W	2904.8	22.9	9.6	
			POS533_64-3	13.03.2019 14:35	CTD	max depth/on	28° 19,191' N	015° 58,659' W	2931.2	35.2	8.2	SLmax = 2938 m
			POS533_64-3	13.03.2019 15:34	CTD	on deck	28° 19,139' N	015° 58,549' W	2935.9	39.7	8.9	
			POS533_65-1	13.03.2019 17:53	Balloon	information	28° 10,702' N	015° 52,432' W	837.5	45.9	8.7	launched
St 38	1	Canaria NW 100	POS533_66-1	13.03.2019 20:39	CTD	in the water	27° 58,542' N	015° 52,944' W	99.3	31.6	16.1	
			POS533_66-1	13.03.2019 20:45	CTD	max depth/on	27° 58,549' N	015° 52,921' W	96.1	31	14.1	85 m max
			POS533_66-1	13.03.2019 20:56	CTD	on deck	27° 58,533' N	015° 52,885' W	1.2	30	13.6	
			POS533_67-1	13.03.2019 23:29	Balloon	information	27° 49,063' N	015° 50,159' W	82.6	215.3	1.7	Launched
			POS533_68-1	13.03.2019 23:43	Trace Metal Fish	in the water	27° 48,626' N	015° 49,848' W	82.6	244.8	1.5	
			POS533_68-1	13.03.2019 23:53	Trace Metal Fish	on deck	27° 48,631' N	015° 49,877' W	83.7	221.5	1.3	
St 39	1	Canaria W 100	POS533_68-2	13.03.2019 23:56	CTD	in the water	27° 48,631' N	015° 49,890' W	84.1	241.3	1.4	
			POS533_68-2	14.03.2019 00:00	CTD	max depth/on	27° 48,632' N	015° 49,915' W	85	225.8	1.3	75 m max
			POS533_68-2	14.03.2019 00:08	CTD	on deck	27° 48,625' N	015° 49,962' W	85.6	190.2	1.4	
			POS533_69-1	14.03.2019 02:52	Trace Metal Fish	in the water	27° 41,194' N	015° 42,175' W	125.2	283.1	0.8	
			POS533_69-1	14.03.2019 03:04	Trace Metal Fish	on deck	27° 41,218' N	015° 42,231' W	113.2	346.9	0.7	
St 40	1	Canaria S 100	POS533_69-2	14.03.2019 03:06	CTD	in the water	27° 41,221' N	015° 42,238' W	125.9	351.9	0.6	
			POS533_69-2	14.03.2019 03:12	CTD	max depth/on	27° 41,245' N	015° 42,246' W	122.8	346.5	1.4	SLmax = 115 m
			POS533_69-2	14.03.2019 03:19	CTD	on deck	27° 41,249' N	015° 42,231' W	110.8	334.8	1.5	
			POS533_70-1	14.03.2019 05:32	Balloon	information	27° 42,839' N	015° 33,228' W	68.1	47	7.4	Launched
St 41	1	Canaria SE 100	POS533_71-1	14.03.2019 08:00	CTD	in the water	27° 45,646' N	015° 22,864' W	76.3	30.9	14.6	
			POS533_71-1	14.03.2019 08:06	CTD	max depth/on	27° 45,651' N	015° 22,865' W	76.2	34.9	16.1	70 m max
			POS533_71-1	14.03.2019 08:14	CTD	on deck	27° 45,671' N	015° 22,858' W	76.4	29.2	15	
			POS533_72-1	14.03.2019 10:56	Trace Metal Fish	in the water	27° 57,695' N	015° 19,942' W	0.8	27.9	8.7	
			POS533_72-1	14.03.2019 11:07	Trace Metal Fish	on deck	27° 57,664' N	015° 19,885' W	1.1	18.9	8.3	

GEOMAR			Ship-stations									
St. No.	Cast	Station-Name	Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Wind Dir	Wind Velocity	Comment
St 42	1	Canaria E 100	POS533_72-2	14.03.2019 11:08	CTD	in the water	27° 57,661' N	015° 19,876' W	397.2	24.4	8.3	
			POS533_72-2	14.03.2019 11:19	CTD	max depth/on	27° 57,620' N	015° 19,819' W	1	26	8.7	395 m max
			POS533_72-2	14.03.2019 11:33	CTD	on deck	27° 57,571' N	015° 19,756' W	1	10.7	8.9	Cease of research operations POS 533
St 43	1	Canaria NE 100	POS533_73-1	15.03.2019 10:04	CTD	in the water	28° 07,088' N	015° 22,871' W	53.1	26.2	2.7	Resume of research operations POS 533
			POS533_73-1	15.03.2019 10:12	CTD	max depth/on	28° 07,066' N	015° 22,875' W	1.1	20.5	4.2	300 m max
			POS533_73-1	15.03.2019 10:23	CTD	on deck	28° 07,060' N	015° 22,849' W	17.2	21	2.7	
			POS533_74-1	15.03.2019 11:34	Balloon	information	28° 15,225' N	015° 23,465' W	1765.4	59.3	5	Launched
			POS533_75-1	15.03.2019 17:39	Balloon	information	28° 59,841' N	015° 28,783' W	3606.3	42.6	6.2	Launched
			POS533_76-1	15.03.2019 19:03	Trace Metal Fish	in the water	29° 10,012' N	015° 30,019' W	3609.3	36.7	5.8	
			POS533_76-1	15.03.2019 19:15	Trace Metal Fish	on deck	29° 10,022' N	015° 30,027' W	3609.5	20.8	6.6	
St 44	1	ESTOC 3500	POS533_76-2	15.03.2019 19:16	CTD	in the water	29° 10,018' N	015° 30,025' W	3609.9	20.3	5.4	
			POS533_76-2	15.03.2019 19:23	CTD	max depth/on	29° 10,007' N	015° 30,021' W	3610.1	19.9	6.7	SL max = 200m
			POS533_76-2	15.03.2019 19:35	CTD	on deck	29° 09,986' N	015° 29,987' W	3609.7	24.4	5.5	
St 44	2	ESTOC 3500	POS533_76-3	15.03.2019 20:14	CTD	in the water	29° 10,033' N	015° 30,003' W	3609.7	34.9	7	
			POS533_76-3	15.03.2019 21:16	CTD	max depth/on	29° 09,965' N	015° 29,901' W	3610.1	24.8	7.9	3545 m max
			POS533_76-3	15.03.2019 22:33	CTD	on deck	29° 09,826' N	015° 29,895' W	3610.2	40.2	7.2	
			POS533_77-1	15.03.2019 23:37	Balloon	information	29° 14,822' N	015° 33,255' W	3611.1	29.9	9.4	Launched
			POS533_78-1	16.03.2019 05:33	Balloon	information	29° 44,362' N	015° 52,571' W	3555.1	58.7	6	Launched
			POS533_79-1	16.03.2019 08:55	Trace Metal Fish	in the water	30° 01,088' N	016° 04,746' W	374.3	43.8	5.5	
			POS533_79-1	16.03.2019 09:07	Trace Metal Fish	on deck	30° 01,064' N	016° 04,745' W	344.5	8.8	6.5	
St 45	1	Selvagens 100	POS533_79-2	16.03.2019 09:11	CTD	in the water	30° 01,053' N	016° 04,741' W	350	58.7	4.7	
			POS533_79-2	16.03.2019 09:19	CTD	max depth/on	30° 01,038' N	016° 04,735' W	311.7	34.1	6.3	300 m max
			POS533_79-2	16.03.2019 09:33	CTD	on deck	30° 01,033' N	016° 04,705' W	289.4	26.8	4	
			POS533_80-1	16.03.2019 11:40	Balloon	information	30° 11,694' N	016° 10,713' W	3349	15.6	6.9	Launched
			POS533_81-1	16.03.2019 17:25	Balloon	information	30° 42,347' N	016° 27,337' W	4210.4	27	8.1	launched
			POS533_82-1	16.03.2019 23:33	Balloon	information	31° 18,506' N	016° 48,198' W	4420.1	40.2	7.8	Launched
			POS533_83-1	17.03.2019 05:32	Balloon	information	31° 56,496' N	017° 10,006' W	4311.5	41.8	7.1	Launched
			POS533_84-1	17.03.2019 11:28	Balloon	information	32° 34,387' N	017° 31,657' W	3697.2	28.3	11.6	Launched
St 46	1	Trans. M1 3000	POS533_85-1	17.03.2019 13:01	CTD	in the water	32° 43,260' N	017° 37,679' W	3069.1	45.5	11.4	
			POS533_85-1	17.03.2019 13:09	CTD	max depth/on	32° 43,270' N	017° 37,664' W	3074.9	46.9	12	SLmax = 300 m
			POS533_85-1	17.03.2019 13:20	CTD	on deck	32° 43,263' N	017° 37,651' W	3067.1	50	10.8	
St 46	2	Trans. M1 3000	POS533_85-2	17.03.2019 13:50	CTD	in the water	32° 43,286' N	017° 37,723' W	3073.4	48.7	10.2	
			POS533_85-2	17.03.2019 14:42	CTD	max depth/on	32° 43,281' N	017° 37,704' W	3077.7	43.3	8.8	SLmax = 3000 m
			POS533_85-2	17.03.2019 15:50	CTD	on deck	32° 43,255' N	017° 37,693' W	3073.5	38.4	12	
			POS533_86-1	17.03.2019 17:22	Balloon	information	32° 40,379' N	017° 29,226' W	3110.7	36.6	16.2	launched
St 47	1	Trans. M2 600	POS533_87-1	17.03.2019 17:49	CTD	in the water	32° 39,599' N	017° 27,443' W	3087	31.3	13.6	
			POS533_87-1	17.03.2019 18:01	CTD	max depth/on	32° 39,614' N	017° 27,426' W	3091.5	40.9	9.4	SL max = 600m
			POS533_87-1	17.03.2019 18:22	CTD	on deck	32° 39,597' N	017° 27,410' W	3089	41.5	14.7	
St 48	1	Trans. M3 3000	POS533_88-1	17.03.2019 20:20	CTD	in the water	32° 34,433' N	017° 12,919' W	2964.3	253	2.4	
			POS533_88-1	17.03.2019 21:07	CTD	max depth/on	32° 34,515' N	017° 12,989' W	2972.5	255.1	3.5	2800 m max
			POS533_88-1	17.03.2019 22:03	CTD	on deck	32° 34,610' N	017° 13,049' W	3004.4	223.4	4.8	
			POS533_89-1	17.03.2019 23:31	Balloon	information	32° 32,077' N	017° 06,441' W	2597.1	9.2	1.9	Launched
St 49	1	Trans. M4 600	POS533_90-1	18.03.2019 01:20	CTD	in the water	32° 29,064' N	016° 58,228' W	2657.9	65.2	10	
			POS533_90-1	18.03.2019 01:33	CTD	max depth/on	32° 29,104' N	016° 58,207' W	2703.3	38.2	8.4	SLmax = 600 m
			POS533_90-1	18.03.2019 01:52	CTD	on deck	32° 29,084' N	016° 58,183' W	2636.1	56.7	9	
St 50	1	Trans. M5 3000	POS533_91-1	18.03.2019 04:31	CTD	in the water	32° 22,959' N	016° 41,524' W	3292	25.5	11.7	
			POS533_91-1	18.03.2019 04:40	CTD	max depth/on	32° 22,963' N	016° 41,507' W	3291.3	25	10.3	SL max = 400m
			POS533_91-1	18.03.2019 04:56	CTD	on deck	32° 22,986' N	016° 41,489' W	3293.5	23.2	9.9	
			POS533_91-2	18.03.2019 05:34	Balloon	information	32° 22,980' N	016° 41,505' W	3290.4	26.4	9.7	launched
St 50	2	Trans. M5 3000	POS533_91-3	18.03.2019 05:36	CTD	in the water	32° 22,983' N	016° 41,504' W	3298.5	38.9	9.9	
			POS533_91-3	18.03.2019 06:33	CTD	max depth/on	32° 22,972' N	016° 41,508' W	3294	32	10.9	SL max = 3200m
			POS533_91-3	18.03.2019 07:41	CTD	on deck	32° 22,957' N	016° 41,459' W	3294.1	33.2	12.1	
St 51	1	Trans. M6 600	POS533_92-1	18.03.2019 10:09	CTD	in the water	32° 16,321' N	016° 23,347' W	3705.2	39.7	12.1	
			POS533_92-1	18.03.2019 10:21	CTD	max depth/on	32° 16,306' N	016° 23,335' W	3740.3	41	10.3	SL max = 600 m
			POS533_92-1	18.03.2019 10:44	CTD	on deck	32° 16,254' N	016° 23,256' W	3775.3	32	9	
			POS533_93-1	18.03.2019 11:38	Balloon	information	32° 20,788' N	016° 27,540' W	1333.6	41.8	12.2	Launched
			POS533_94-1	18.03.2019 12:26	Trace Metal Fish	in the water	32° 24,240' N	016° 31,566' W	188	33.6	11.4	
			POS533_94-1	18.03.2019 12:34	Trace Metal Fish	on deck	32° 24,227' N	016° 31,496' W	196.7	13.2	11.3	
St 52	1	Il. Desert. S 600	POS533_94-2	18.03.2019 12:54	CTD	in the water	32° 24,238' N	016° 31,644' W	189.2	57.4	10.2	
			POS533_94-2	18.03.2019 13:02	CTD	max depth/on	32° 24,252' N	016° 31,600' W	175.6	41.1	10.1	SLmax = 150 m
			POS533_94-2	18.03.2019 13:09	CTD	on deck	32° 24,241' N	016° 31,551' W	187.7	32.9	11.2	
St 53	1	Il. Desert. N 600	POS533_95-1	18.03.2019 15:20	CTD	in the water	32° 33,841' N	016° 34,845' W	215.8	33.9	6.9	
			POS533_95-1	18.03.2019 15:27	CTD	max depth/on	32° 33,834' N	016° 34,839' W	234.2	44.6	7.9	SLmax 180 m
			POS533_95-1	18.03.2019 15:38	CTD	on deck	32° 33,835' N	016° 34,842' W	216.1	43.7	7.6	
			POS533_96-1	18.03.2019 16:46	Trace Metal Fish	in the water	32° 38,822' N	016° 35,437' W	333.6	63.1	12.3	
			POS533_96-1	18.03.2019 16:55	Trace Metal Fish	on deck	32° 38,820' N	016° 35,436' W	353.4	64.1	10.9	
St 54	1	Ridge M 600	POS533_96-2	18.03.2019 17:00	CTD	in the water	32° 38,815' N	016° 35,440' W	334.9	70.4	13.6	
			POS533_96-2	18.03.2019 17:09	CTD	max depth/on	32° 38,818' N	016° 35,450' W	338.7	59.2	12.4	SL max = 300m
			POS533_96-2	18.03.2019 17:27	CTD	on deck	32° 38,758' N	016° 35,455' W	343.8	54.5	11.5	
			POS533_96-3	18.03.2019 17:43	Balloon	information	32° 38,706' N	016° 35,377' W	335.3	52.8	11.5	launched
			POS533_97-1	18.03.2019 18:37	CTD	in the water	32° 44,256' N	016° 35,978' W	129.6	39.4	11.5	
St 55	1	Trans. M7 300	POS533_97-1	18.03.2019 18:43	CTD	max depth/on	32° 44,236' N	016° 35,959' W	129.6	41	11.4	SL max = 115m
			POS533_97-1	18.03.2019 18:52	CTD	on deck	32° 44,237' N	016° 35,924' W	130.7	41.7	12.5	
St 56	1	Trans. M8 100	POS533_98-1	18.03.2019 20:24	CTD	in the water	32° 43,344' N	016° 42,640' W	305.9	21	11.5	
			POS533_98-1	18.03.2019 20:31	CTD	max depth/on	32° 43,347' N	016° 42,597' W	284.6	39	9.8	220 m max
			POS533_98-1	18.03.2019 20:44	CTD	on deck	32° 43,303' N	016° 42,534' W	331.5	15.9	10.2	

GEOMAR			Ship-stations									
St. No.	Cast	Station-Name	Activity - Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Wind Dir	Wind Velocity	Comment
St 57	1	Trans. M9 600	POS533_99-1	18.03.2019 22:13	CTD	in the water	32° 36,761' N	016° 47,861' W	968.7	26.4	12.9	
			POS533_99-1	18.03.2019 22:30	CTD	max depth/on	32° 36,771' N	016° 47,860' W	960.5	28.8	16.4	912 m max
			POS533_99-1	18.03.2019 22:53	CTD	on deck	32° 36,763' N	016° 47,793' W	922.5	21	11.9	
			POS533_100-1	18.03.2019 23:34	Balloon	information	32° 36,264' N	016° 50,740' W	48.9	44.9	14.9	Launched
St 58	1	Trans. M10 600	POS533_101-1	19.03.2019 01:15	CTD	in the water	32° 36,216' N	017° 03,328' W	929.5	89.3	3.8	
			POS533_101-1	19.03.2019 01:28	CTD	max depth/on	32° 36,239' N	017° 03,304' W	927.8	100	5.2	SLmax = 600 m
			POS533_101-1	19.03.2019 01:47	CTD	on deck	32° 36,242' N	017° 03,259' W	946.7	341.2	1.4	
St 59	1	Trans. M11 600	POS533_102-1	19.03.2019 03:09	CTD	in the water	32° 41,510' N	017° 12,098' W	953.8	30.4	4.4	
			POS533_102-1	19.03.2019 03:24	CTD	max depth/on	32° 41,504' N	017° 12,010' W	941.8	23.6	2.1	SLmax = 900 m
			POS533_102-1	19.03.2019 03:43	CTD	on deck	32° 41,500' N	017° 12,023' W	957.6	10.6	5.5	
			POS533_103-1	19.03.2019 05:40	Balloon	information	32° 47,225' N	017° 22,950' W	1041.9	65.6	16.2	launched
St 60	1	Trans. M12 600	POS533_103-2	19.03.2019 05:46	CTD	in the water	32° 47,229' N	017° 22,954' W	1051	59.6	12.8	
			POS533_103-2	19.03.2019 06:06	CTD	max depth/on	32° 47,212' N	017° 22,924' W	1038.2	56.6	14.6	SL max = 1000m
			POS533_103-2	19.03.2019 06:30	CTD	on deck	32° 47,217' N	017° 22,879' W	1033.5	51	15.5	
			POS533_104-1	19.03.2019 07:10	Trace Metal Fish	in the water	32° 48,703' N	017° 19,373' W	88.2	68	14	
			POS533_104-1	19.03.2019 07:20	Trace Metal Fish	on deck	32° 48,730' N	017° 19,399' W	1.3	67.1	11.1	
St 62	1	Madeira C2 100	POS533_105-1	19.03.2019 08:24	CTD	in the water	32° 43,133' N	017° 14,291' W	0.8	40.9	7.6	
			POS533_105-1	19.03.2019 08:30	CTD	max depth/on	32° 43,097' N	017° 14,250' W	0.8	47	3	150 m max
			POS533_105-1	19.03.2019 08:40	CTD	on deck	32° 43,099' N	017° 14,224' W	0.8	53.5	4.2	
			POS533_106-1	19.03.2019 09:43	Trace Metal Fish	in the water	32° 39,086' N	017° 06,852' W	0.8	329.1	2.9	
			POS533_106-1	19.03.2019 09:53	Trace Metal Fish	on deck	32° 39,079' N	017° 06,822' W	0.8	314.6	1.2	
St 63	1	Madeira C3 100	POS533_106-2	19.03.2019 09:55	CTD	in the water	32° 39,079' N	017° 06,819' W	0.8	238.8	0.6	
			POS533_106-2	19.03.2019 10:07	CTD	max depth/on	32° 39,098' N	017° 06,805' W	0.8	286.9	1.7	215 m max
			POS533_106-2	19.03.2019 10:17	CTD	on deck	32° 39,119' N	017° 06,772' W	0.9	248.9	3	
			POS533_107-1	19.03.2019 11:33	Balloon	information	32° 34,818' N	016° 56,831' W	0.8	245.6	4.5	Launched
St 64	1	Madeira C4 100	POS533_108-1	19.03.2019 12:14	CTD	in the water	32° 37,380' N	016° 53,226' W	644.1	232.6	3.3	
			POS533_108-1	19.03.2019 12:29	CTD	max depth/on	32° 37,403' N	016° 53,175' W	620	239.2	4.6	SLmax = 606 m
			POS533_108-1	19.03.2019 12:45	CTD	on deck	32° 37,354' N	016° 53,174' W	645.3	261.1	2.4	Completion of research operations POS 533

7.3 Station Sample List

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 1	1	Antao-100	1	1	POS533_CTD_001	60.0											1	1	1	1	1	1	60.8	61.2	22.4778	36.4630	214.24	0.665	9.997	1025.1977	1025.4589	16.91060	-25.16598	2019	2	28	14	16	25	215.42	0.060
St 1	1	Antao-100	1	2	POS533_CTD_002	60.0	1	1	1		1												61.1	61.5	22.4777	36.4631	214.01	0.626	9.809	1025.1978	1025.4605	16.91060	-25.16598	2019	2	28	14	16	28	NaN	0.069
St 1	1	Antao-100	1	3	POS533_CTD_003	50.0											1	1	1	1	1		50.5	50.8	22.4861	36.4620	214.12	0.648	17.229	1025.1940	1025.4111	16.91044	-25.16596	2019	2	28	14	18	25	217.98	0.045
St 1	1	Antao-100	1	4	POS533_CTD_004	50.0	1	1	1		1												50.8	51.1	22.4848	36.4619	214.22	0.626	17.098	1025.1943	1025.4128	16.91044	-25.16596	2019	2	28	14	18	27	NaN	0.057
St 1	1	Antao-100	1	5	POS533_CTD_005	40.0											1	1	1	1	1		40.9	41.1	22.5024	36.4623	214.20	0.533	27.719	1025.1890	1025.3647	16.91044	-25.16586	2019	2	28	14	19	59	217.33	0.029
St 1	1	Antao-100	1	6	POS533_CTD_006	40.0	1	1	1		1												40.7	41.0	22.5027	36.4623	214.49	0.533	27.956	1025.1889	1025.3640	16.91044	-25.16586	2019	2	28	14	20	1	NaN	0.028
St 1	1	Antao-100	1	7	POS533_CTD_007	30											1	1	1	1	1		31.0	31.2	22.5079	36.4630	214.57	0.547	39.701	1025.1874	1025.3208	16.91042	-25.16575	2019	2	28	14	21	16	216.24	0.040
St 1	1	Antao-100	1	8	POS533_CTD_008	30	1	1	1		1												31.0	31.1	22.5070	36.4630	214.61	0.550	40.774	1025.1876	1025.3207	16.91042	-25.16574	2019	2	28	14	21	18	NaN	0.041
St 1	1	Antao-100	1	9	POS533_CTD_009	20											1	1	1	1	1		21.2	21.4	22.5490	36.4665	214.81	0.371	56.781	1025.1777	1025.2690	16.91032	-25.16579	2019	2	28	14	22	40	214.88	0.027
St 1	1	Antao-100	1	10	POS533_CTD_010	20	1	1	1		1												21.6	21.8	22.5393	36.4658	214.90	0.398	54.773	1025.1799	1025.2729	16.91034	-25.16580	2019	2	28	14	22	42	NaN	0.025
St 1	1	Antao-100	1	11	POS533_CTD_011	10											1	1	1	1	1		10.5	10.5	22.5569	36.4674	215.22	0.264	134.180	1025.1755	1025.2204	16.91014	-25.16554	2019	2	28	14	26	47	215.16	0.007
St 1	1	Antao-100	1	12	POS533_CTD_012	10	1	1	1		1												10.4	10.4	22.5571	36.4675	215.13	0.255	132.120	1025.1755	1025.2200	16.91014	-25.16554	2019	2	28	14	26	49	NaN	0.007
St 2	1	Antao-3000	2	1	POS533_CTD_013	615.0		1	1	1	1				1	1	1	1					609.4	614.0	8.0950	34.9799	83.35	-0.040	0.000	1027.2535	1030.0276	16.71561	-25.37422	2019	2	28	19	27	12	80.84	-0.013
St 2	1	Antao-3000	2	2	POS533_CTD_014	300.0	1	1	1	1	1			1	1	1	1	1					299.0	301.0	11.4621	35.3236	44.85	-0.027	0.000	1026.9496	1028.2915	16.71515	-25.37395	2019	2	28	19	32	58	42.54	-0.001
St 2	1	Antao-3000	2	3	POS533_CTD_015	120.0											1	1	1	1	1	1	123.2	124.0	18.7733	36.1836	126.19	0.049	0.000	1025.9899	1026.5264	16.71485	-25.37394	2019	2	28	19	36	45	126.74	0.017
St 2	1	Antao-3000	2	4	POS533_CTD_016	120.0	1	1	1	1	1			1	1	1							123.0	123.7	18.8987	36.1988	124.52	0.026	0.000	1025.9694	1026.5044	16.71485	-25.37394	2019	2	28	19	36	49	NaN	-0.001
St 2	1	Antao-3000	2	5	POS533_CTD_017	90.0											1	1	1	1	1	1	94.1	94.7	21.9702	36.4118	195.50	0.336	0.000	1025.3047	1025.7098	16.71476	-25.37394	2019	2	28	19	38	13	194.50	0.019
St 2	1	Antao-3000	2	6	POS533_CTD_018	90.0	1	1	1	1	1			1	1	1							93.4	94.0	22.0046	36.4141	195.38	0.328	0.000	1025.2967	1025.6986	16.71476	-25.37395	2019	2	28	19	38	15	NaN	0.011
St 2	1	Antao-3000	2	7	POS533_CTD_019	70											1	1	1	1	1	1	73.3	73.8	22.3827	36.4121	207.69	0.570	0.000	1025.1869	1025.5021	16.71471	-25.37388	2019	2	28	19	39	7	207.53	0.034
St 2	1	Antao-3000	2	8	POS533_CTD_020	70	1	1	1	1	1			1	1	1							73.0	73.5	22.3871	36.4109	208.19	0.583	0.000	1025.1847	1025.4985	16.71472	-25.37384	2019	2	28	19	39	19	NaN	0.029
St 2	1	Antao-3000	2	9	POS533_CTD_021	35											1	1	1	1	1		39.5	39.7	22.7501	36.3230	213.76	0.478	0.000	1025.0120	1025.1816	16.71470	-25.37362	2019	2	28	19	41	19	213.18	0.020
St 2	1	Antao-3000	2	10	POS533_CTD_022	35	1	1	1	1	1			1	1	1							39.5	39.7	22.7484	36.3235	212.91	0.474	0.000	1025.0128	1025.1822	16.71468	-25.37362	2019	2	28	19	41	24	NaN	0.022
St 2	1	Antao-3000	2	11	POS533_CTD_023	10											1	1	1	1	1		15.5	15.6	22.7686	36.3146	213.66	0.509	0.000	1024.9989	1025.0654	16.71458	-25.37360	2019	2	28	19	42	43	214.97	0.020
St 2	1	Antao-3000	2	12	POS533_CTD_024	10	1	1	1	1	1			1	1	1							14.8	14.9	22.7690	36.3150	214.06	0.497	0.000	1024.9990	1025.0627	16.71456	-25.37362	2019	2	28	19	42	53	NaN	0.028
St 3	1	Vincente-100	3	1	POS533_CTD_025	55.0											1	1	1	1	1		56.0	56.3	22.2698	36.3066	210.66	1.325	0.000	1025.1379	1025.3785	16.81370	-25.11188	2019	2	28	23	7	5	211.67	0.054
St 3	1	Vincente-100	3	2	POS533_CTD_026	55.0	1		1	1	1												55.8	56.1	22.2703	36.3068	210.99	1.305	0.000	1025.1379	1025.3778	16.81370	-25.11188	2019	2	28	23	7	7	NaN	0.055
St 3	1	Vincente-100	3	3	POS533_CTD_027	50.0											1	1	1	1	1		49.3	49.6	22.4120	36.2981	212.21	1.271	0.000	1025.0905	1025.3026	16.81376	-25.11176	2019	2	28	23	8	42	211.79	0.052
St 3	1	Vincente-100	3	4	POS533_CTD_028	50.0	1		1	1	1												49.0	49.3	22.4086	36.2983	211.64	1.240	0.000	1025.0916	1025.3022	16.81376	-25.11176	2019	2	28	23	8	45	NaN	0.049
St 3	1	Vincente-100	3	5	POS533_CTD_029	40.0											1	1	1	1	1	1	39.5	39.7	22.5719	36.3004	213.86	0.796	0.000	1025.0460	1025.2157	16.81376	-25.11166	2019	2	28	23	10	37	215.02	0.035
St 3	1	Vincente-100	3	6	POS533_CTD_030	40.0	1		1	1	1												39.6	39.8	22.5733	36.3001	214.40	1.301	0.000	1025.0454	1025.2154	16.81374	-25.11166	2019	2	28	23	10	39	NaN	0.040
St 3	1	Vincente-100	3	7	POS533_CTD_031	30											1	1	1	1	1		29.2	29.4	22.6037	36.2959	215.43	0.610	0.000	1025.0329	1025.1584	16.81370	-25.11163	2019	2	28	23	11	35	215.79	0.026
St 3	1	Vincente-100	3	8	POS533_CTD_032	30	1	1	1	1	1												29.4	29.6	22.6035	36.2958	215.19	0.581	0.000	1025.0329	1025.1593	16.81370	-25.11162	2019	2	28	23	11	36	NaN	0.028
St 3	1	Vincente-100	3	9	POS533_CTD_033	20											1	1	1	1	1		19.5	19.6	22.6202	36.2907	215.92	0.561	0.000	1025.0236	1025.1074	16.81364	-25.11166	2019	2	28	23	12	28	216.10	0.036
St 3	1	Vincente-100	3	10	POS533_CTD_034	20	1	1	1	1	1												19.3	19.4	22.6208	36.2905	215.79	0.544	0.000	1025.0233	1025.1060	16.81364	-25.11166	2019	2	28	23	12	30	NaN	0.038
St 3	1	Vincente-100	3	11	POS533_CTD_035	10											1	1	1	1	1		9.6	9.6	22.6115	36.2919	215.53	0.578	0.003	1025.0264	1025.0675	16.81358	-25.11160	2019	2	28	23	13	53	216.04	0.029
St 3	1	Vincente-100	3	12	POS533_CTD_036	10	1	1	1	1	1												9.9	10.0	22.6137	36.2918	215.55	0.553	0.001	1025.0257	1025.0683	16.81358	-25.11160	2019	2	28	23	13	55	NaN	0.031
St 4	1	Nicolau-100	4	1	POS533_CTD_037	672.0		1	1	1	1						1	1					671.6	676.7	7.4921	34.9721	97.83	-0.017	0.000	1027.3368	1030.4016	16.55563	-24.38535	2019	3	1	8	1	41	96.32	-0.013
St 4	1	Nicolau-100	4	2	POS533_CTD_038	280.0	1	1	1	1	1						1	1					278.1	280.0	12.0010	35.4599	68.25	-0.028	0.000	1026.9533	1028.1982	16.55572	-24.38534	2019	3	1	8	10	6	67.68	-0.001
St 4	1	Nicolau-100	4	3	POS533_CTD_039	75.0											1	1	1	1	1		75.7	76.2	21.1673	36.3420	170.01	0.370	0.030	1025.4741	1025.8009	16.55594	-24.38510	2019	3	1	8	14	42	167.79	0.007
St 4	1	Nicolau-100	4	4	POS533_CTD_040	75.0	1	1	1	1	1												75.5	76.0	21.1657	36.3413	169.99	0.376	0.031	1025.4740	1025.8000	16.55594	-24.38510	2019	3	1	8	14	44	NaN	0.011
St 4	1	Nicolau-100	4	5	POS533_CTD_041	60.0											1	1	1	1	1		60.8	61.1	22.0104	36.3673	194.51	0.740	0.145	1025.2577	1025.5192	16.55590	-24.38512	2019	3	1	8	15	56	195.62	0.019
St 4	1	Nicolau-100	4	6	POS533_CTD_042	60.0	1	1	1	1	1												60.8	61.2	22.0063	36.3675	195.67	0.730	0.146	1025.2590	1025.5209	16.55590	-24.38512	2019	3	1	8	15	58	NaN	0.012
St 4	1	Nicolau-100	4	7	POS533_CTD_043	45											1	1	1	1	1	1	45.9	46.1	22.3791	36.3572	211.79	0.680	0.500	1025.1446	1025.3419	16.55585	-24.38518	2019	3	1	8	17	13	211.64	0.023
St 4	1	Nicolau-100	4	8	POS533_CTD_044	45	1	1	1	1	1												45.8	46.1	22.3794	36.3573	212.18	0.665	0.502	1025.1446	1025.3416	16.55584	-24.38518	2019	3	1	8	17	14	NaN	0.027
St 4	1	Nicolau-100	4	9	POS533_CTD_045	25											1	1	1	1	1		26.4	26.5	22.3781	36.3567	212.72	0.637	2.086	1025.1434	1025.2567	16.55582	-24.38528	2019	3	1	8	18	27	211.60	0.021
St 4	1	Nicolau-100	4	10	POS533_CTD_046	25	1	1	1	1	1												26.4	26.6	22.3781	36.3567	212.63	0.675	2.077	1025.1434	1025.2569	16.55582	-24.38528	2019	3	1	8	18	29	NaN	0.022
St 4	1	Nicolau-100	4	11	POS533_CTD_047	10											1	1	1	1	1	1	11.3	11.4	22.3708	36.3570	212.42	0.749	5.322	1025.1449	1025.1934	16.55586	-24.38532	2019	3	1	8	19	34	211.87	0.029
St 4	1	Nicolau-100	4	12	POS533_CTD_048	10	1	1	1	1	1												11.7	11.8	22.3714	36.3570	212.92	0.623	5.124	1025.1447	1025.1951	16.55586	-24.38532	2019	3	1	8	19	36	NaN	0.047
St 5	1	Fogo-100	5	1	POS533_CTD_049	110											1	1	1	1	1		111.2	111.9	15.6661	35.8634	84.57	0.046	0.000	1026.4924	1026.9826	14.85890	-24.48066	2019	3	1	21	14	3	84.46	-0.008
St 5	1	Fogo-100	5	2	POS533_CTD_050	110	1	1	1	1	1		1	1	1	1							111.1	111.7	15.6692	35.8641	84.47	0.066	0.000	1026.4923	1026.9819	14.85890	-24.48066	2019	3	1	21	14	5	NaN	-0.010
St 5	1	Fogo-100	5	3	POS533_CTD_051	90											1	1	1	1	1		92.1	92.7	16.6789	35.9909	92.91	0.125	0.000	1026.3552	1026.7597	14.85900	-24.48069	2019	3	1	21	15	14	94.59	-0.006
St 5	1	Fogo-100	5	4	POS533_CTD_052	90	1	1	1	1	1		1	1	1	1							91.9	92.5	16.7386	35.9938	92.25	0.135	0.000	1026.3432	1026.7467	14.85900	-24.48070	2019	3	1	21	15	16	NaN	-0.009
St 5	1	Fogo-100	5	5	POS533_CTD_053	70											1	1	1	1	1		72.4	72.9	20.4092	36.2724	169.41	0.630	0.000	1025.6270	1025.9405	14.85913	-24.48070	2019	3	1	21	16	40	167.81	0.003
St 5	1	Fogo-100	5	6	POS533_CTD_054	70	1	1	1	1	1		1	1	1	1							72.2	72.7	20.8868	36.3062	166.70	0.682	0.000	1025.5235	1025.8356	14.85912	-24.48070	2019	3	1	21	16	41	NaN	0.008
St 5	1	Fogo-100	5	7	POS533_CTD_055	55											1	1	1	1	1	1	57.4	57.8	21.2276	36.3272	178.60	0.828	0.000	1025.4452	1025.6930	14.85930	-24.48074	2019	3	1	21	18	11	179.81	-0.024
St 5	1	Fogo-100	5	8	POS533_CTD_056	55	1	1	1	1	1		1	1	1	1							57.0	57.4	21.2271	36.3275	178.35	0.912	0.000	1025.4456	1025.6917	14.85930	-24.48075	2019	3	1	21	18	13	NaN	-0.018
St 5	1	Fogo-100	5	9	POS533_CTD_057	40											1	1	1	1	1		42.0	42.2	22.3488	36.2920	208.21	1.038	0.000	1025.1035	1025.2840	14.85939	-24.48082	2019	3	1	21	19	19	208.59	0.021
St 5	1	Fogo-100	5	10	POS533_CTD_058	40	1	1	1	1	1		1	1	1	1							41.9	42.2	22.3494	36.2904	206.93	1.054	0.000	1025.1021	1025.2823	14.85940	-24.48082	2019	3	1	21	19	21	NaN	0.006
St 5	1	Fogo-100	5	11	POS533_CTD_059	10											1	1	1	1	1		12.8	12.8	23.5050	36.0644	211.10	0.083	0.000	1024.5946	1024.6493	14.85954	-24.48092	2019	3	1	21	21	5	213.83	0.003
St 5	1	Fogo-100	5	12	POS533_CTD_060	10	1	1	1	1	1		1	1	1	1							13.0	13.1	23.5039	36.0645	210.61	0.083	0.000	1024.5950	1024.6507	14.85953	-24.48092	2019	3	1	21	21	6	NaN	0.010
St 6	1	Fogo-500	6	1	POS533_CTD_061	350.0											1	1	1	1	1	1	342.2	344.5	11.3169	35.3172	55.15	-0.023	0.000	1026.9725	1028.5086	14.84014	-24.26096	2019	3	2	1	14	37	53.48	-0.008
St 6	1	Fogo-500	6	2	POS533_CTD_062	350.0		1	1	1	1												341.5	343.8	11.3152	35.3168	55.14	-0.026	0.000	1026.9725	1028.5054	14.84010	-24.26094	2019	3	2	1	14	42	NaN	-0.016
St 6	1	Fogo-500	6	3	POS533_CTD_063	150.0											1	1	1	1	1	1	150.6	151.6	13.7402	35.5656	74.71	-0.025	0.000	1026.6836	1027.3532	14.83815	-24.26016	2019	3	2	1	20	10	75.41	-0.008
St 6	1	Fogo-500	6	4	POS533_CTD_064	150.0	1	1	1	1	1												150.7	151.6	13.7561	35.5679	74.68	-0.029	0.000	1026.6821	1027.3517	14.83814	-24.26014	2019	3	2	1	20	11	NaN	-0.005
St 6	1	Fogo-500	6	5	POS533_CTD_065	100.0											1	1	1	1	1	1	104.3	104.9	16.4119	35.9651	89.24	0.051	0.000	1026.3986	1026.8570	14.83745	-24.25982	2019	3	2	1	22	21	92.44	-0.003
St 6	1	Fogo-500	6	6	POS533_CTD_066	100.0	1	1	1	1	1												104.8	105.5	16.3629	35.9558	90.04	0.044	0.000	1026.4029	1026.8636	14.83744	-24.25981	2019	3	2	1	22	23	NaN	-0.009
St 6	1	Fogo-500	6	7	POS533_CTD_067	50											1	1	1	1	1	1	49.7	50.0	22.3582	36.2513	211.72	0.602	0.000	1025.0704	1025.2839	14.83760	-24.25942	2019	3	2	1	24	48	211.56	0.020

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
No.	Cast	Station Name																																							
St 6	1	Fogo-500	6	8	POS533_CTD_068	50	1	1	1	1	1												49.3	49.6	22.3600	36.2507	211.54	0.654	0.000	1025.0694	1025.2815	14.83760	-24.25942	2019	3	2	1	24	50	NaN	0.024
St 6	1	Fogo-500	6	9	POS533_CTD_069	30											1	1	1	1	1	1	32.2	32.4	22.4583	36.2293	211.66	0.604	0.000	1025.0240	1025.1627	14.83774	-24.25910	2019	3	2	1	26	20	211.11	0.011
St 6	1	Fogo-500	6	10	POS533_CTD_070	30	1	1	1	1	1												32.6	32.8	22.4508	36.2312	211.12	0.793	0.000	1025.0277	1025.1679	14.83774	-24.25909	2019	3	2	1	26	22	NaN	0.013
St 6	1	Fogo-500	6	11	POS533_CTD_071	10											1	1	1	1	1	1	12.8	12.8	22.5096	36.2155	211.47	0.545	0.000	1024.9978	1025.0527	14.83778	-24.25882	2019	3	2	1	28	0	211.77	0.019
St 6	1	Fogo-500	6	12	POS533_CTD_072	10	1	1	1	1	1												12.8	12.9	22.5120	36.2153	211.78	0.534	0.000	1024.9969	1025.0519	14.83778	-24.25880	2019	3	2	1	28	2	NaN	0.021
St 7	1	Santiago W-100	7	1	POS533_CTD_073																		296.8	298.8	11.8087	35.3838	55.53	-0.024	0.000	1026.9313	1028.2609	14.93392	-23.69075	2019	3	2	7	22	26	NaN	-0.013
St 7	1	Santiago W-100	7	2	POS533_CTD_074																		297.4	299.3	11.8147	35.3858	55.10	-0.010	0.000	1026.9317	1028.2637	14.93392	-23.69074	2019	3	2	7	22	28	NaN	-0.009
St 7	1	Santiago W-100	7	3	POS533_CTD_075																		298.1	300.1	11.8187	35.3883	55.48	-0.029	0.000	1026.9330	1028.2683	14.93392	-23.69074	2019	3	2	7	22	34	NaN	-0.008
St 7	1	Santiago W-100	7	4	POS533_CTD_076																		297.5	299.5	11.8124	35.3865	55.40	-0.029	0.000	1026.9327	1028.2653	14.93393	-23.69074	2019	3	2	7	22	36	NaN	-0.014
St 7	1	Santiago W-100	7	5	POS533_CTD_077																		297.0	298.9	11.8148	35.3874	55.27	-0.022	0.000	1026.9329	1028.2632	14.93394	-23.69074	2019	3	2	7	22	37	NaN	-0.004
St 7	1	Santiago W-100	7	6	POS533_CTD_078																		296.8	298.8	11.8171	35.3865	55.17	-0.026	0.000	1026.9318	1028.2613	14.93394	-23.69074	2019	3	2	7	22	38	NaN	-0.003
St 7	1	Santiago W-100	7	7	POS533_CTD_079																		297.1	299.1	11.8187	35.3861	55.15	-0.040	0.000	1026.9312	1028.2620	14.93394	-23.69074	2019	3	2	7	22	40	NaN	-0.013
St 7	1	Santiago W-100	7	8	POS533_CTD_080																		297.4	299.3	11.8196	35.3866	54.94	-0.034	0.000	1026.9314	1028.2634	14.93394	-23.69074	2019	3	2	7	22	42	NaN	-0.013
St 7	1	Santiago W-100	7	9	POS533_CTD_081																		62.3	62.6	22.1355	36.2731	204.68	0.670	0.000	1025.1508	1025.4187	14.93422	-23.69058	2019	3	2	7	26	53	NaN	0.010
St 7	1	Santiago W-100	7	10	POS533_CTD_082																		62.1	62.5	22.1273	36.2730	204.56	0.683	0.000	1025.1530	1025.4203	14.93422	-23.69059	2019	3	2	7	26	55	NaN	0.002
St 7	1	Santiago W-100	7	11	POS533_CTD_083																		61.8	62.1	22.1269	36.2729	204.31	0.746	0.000	1025.1530	1025.4188	14.93422	-23.69060	2019	3	2	7	26	57	NaN	0.018
St 7	1	Santiago W-100	7	12	POS533_CTD_084																		61.6	62.0	22.1327	36.2734	204.18	0.738	0.000	1025.1518	1025.4167	14.93422	-23.69060	2019	3	2	7	26	58	NaN	0.018
St 8	1	Santiago-3200	8	1	POS533_CTD_073	3000	1	1	1	1	1			1	1		1	1					3001.0	3040.4	2.7117	34.9260	233.83	-0.041	0.000	1027.8740	1041.6559	14.76038	-23.68472	2019	3	2	10	26	49	234.17	-0.019
St 8	1	Santiago-3200	8	2	POS533_CTD_074	2000	1	1	1	1	1			1	1		1	1					2002.9	2024.4	3.5921	34.9719	225.25	-0.053	0.000	1027.8218	1037.0515	14.75936	-23.68326	2019	3	2	10	44	51	225.16	-0.016
St 8	1	Santiago-3200	8	3	POS533_CTD_075	740		1	1	1	1			1	1		1	1					742.9	748.6	7.4773	34.9488	92.47	-0.041	0.000	1027.3216	1030.7099	14.75766	-23.68054	2019	3	2	11	6	58	90.98	-0.013
St 8	1	Santiago-3200	8	4	POS533_CTD_076	350	1	1	1	1	1			1	1		1	1					342.8	345.1	11.5512	35.3498	56.38	-0.037	0.000	1026.9545	1028.4914	14.75664	-23.68014	2019	3	2	11	14	53	56.92	-0.013
St 8	1	Santiago-3200	8	5	POS533_CTD_077	90											1	1	1	1	1	1	90.6	91.1	18.1093	36.1991	109.34	0.180	0.000	1026.1676	1026.5630	14.75654	-23.67987	2019	3	2	11	20	8	112.23	-0.006
St 8	1	Santiago-3200	8	6	POS533_CTD_078	90	1	1	1	1	1			1	1								90.4	90.9	18.1113	36.1994	109.85	0.211	0.000	1026.1673	1026.5618	14.75654	-23.67988	2019	3	2	11	20	10	NaN	0.002
St 8	1	Santiago-3200	8	7	POS533_CTD_079	60											1	1	1	1	1	1	61.6	62.0	22.1248	36.2150	201.81	0.556	0.000	1025.1096	1025.3748	14.75636	-23.67977	2019	3	2	11	21	49	201.97	0.023
St 8	1	Santiago-3200	8	8	POS533_CTD_080	60	1	1	1	1	1			1	1								61.6	62.0	22.1224	36.2155	202.28	0.568	0.000	1025.1107	1025.3759	14.75636	-23.67976	2019	3	2	11	21	51	NaN	0.019
St 8	1	Santiago-3200	8	9	POS533_CTD_081	30											1	1	1	1	1	1	32.2	32.4	22.7856	36.0486	212.64	0.227	0.000	1024.7930	1024.9313	14.75624	-23.67974	2019	3	2	11	23	27	212.46	0.010
St 8	1	Santiago-3200	8	10	POS533_CTD_082	30	1	1	1	1	1			1	1								32.2	32.4	22.7851	36.0488	213.31	0.232	0.000	1024.7932	1024.9315	14.75626	-23.67976	2019	3	2	11	23	30	NaN	0.014
St 8	1	Santiago-3200	8	11	POS533_CTD_083	10											1	1	1	1	1	1	12.0	12.0	22.7874	36.0468	213.28	0.170	0.000	1024.7899	1024.8413	14.75621	-23.67972	2019	3	2	11	24	49	212.53	0.021
St 8	1	Santiago-3200	8	12	POS533_CTD_084	10	1	1	1	1	1			1	1								12.1	12.1	22.7870	36.0468	213.28	0.191	0.000	1024.7900	1024.8418	14.75622	-23.67972	2019	3	2	11	24	52	NaN	0.015
St 9	1	SantiagoSE-100	9	1	POS533_CTD_085	120											1	1	1	1	1		121.3	122.0	14.7535	35.6627	78.20	0.009	0.029	1026.5413	1027.0780	14.89150	-23.50680	2019	3	3	18	7	1	77.78	0.039
St 9	1	SantiagoSE-100	9	2	POS533_CTD_086	120	1	1	1	1		1											121.0	121.7	14.7781	35.6671	78.38	0.009	0.029	1026.5393	1027.0747	14.89150	-23.50680	2019	3	3	18	7	5	NaN	0.034
St 9	1	SantiagoSE-100	9	3	POS533_CTD_087	90											1	1	1	1	1		91.1	91.6	16.0319	35.7954	85.76	0.080	0.241	1026.3557	1026.7568	14.89156	-23.50685	2019	3	3	18	8	26	84.75	0.011
St 9	1	SantiagoSE-100	9	4	POS533_CTD_088	90	1	1	1	1		1											91.0	91.6	15.9899	35.7945	86.77	0.086	0.244	1026.3646	1026.7655	14.89156	-23.50684	2019	3	3	18	8	29	NaN	0.018
St 9	1	SantiagoSE-100	9	5	POS533_CTD_089	70											1	1	1	1	1		71.4	71.8	17.9768	35.9814	115.09	0.265	0.883	1026.0328	1026.3447	14.89162	-23.50690	2019	3	3	18	9	26	113.59	0.015
St 9	1	SantiagoSE-100	9	6	POS533_CTD_090	70	1	1	1	1		1											71.3	71.7	17.9579	35.9757	114.14	0.269	0.887	1026.0331	1026.3445	14.89163	-23.50690	2019	3	3	18	9	28	NaN	0.012
St 9	1	SantiagoSE-100	9	7	POS533_CTD_091	50											1	1	1	1	1	1	51.6	51.9	21.9303	36.0730	195.29	0.428	4.274	1025.0559	1025.2783	14.89168	-23.50694	2019	3	3	18	10	34	190.89	0.018
St 9	1	SantiagoSE-100	9	8	POS533_CTD_092	50	1	1	1	1		1											51.7	52.0	21.9378	36.0732	195.36	0.420	4.240	1025.0539	1025.2765	14.89170	-23.50694	2019	3	3	18	10	36	NaN	0.024
St 9	1	SantiagoSE-100	9	9	POS533_CTD_093	20											1	1	1	1	1		22.5	22.6	22.5533	36.0761	209.17	0.228	32.981	1024.8800	1024.9767	14.89172	-23.50696	2019	3	3	18	11	42	209.13	0.013
St 9	1	SantiagoSE-100	9	10	POS533_CTD_094	20	1	1	1	1		1											22.5	22.6	22.5557	36.0760	209.15	0.239	32.640	1024.8792	1024.9759	14.89172	-23.50696	2019	3	3	18	11	44	NaN	0.019
St 9	1	SantiagoSE-100	9	11	POS533_CTD_095	10											1	1	1	1	1		12.2	12.3	22.5459	36.0764	209.39	0.278	79.392	1024.8817	1024.9341	14.89170	-23.50692	2019	3	3	18	12	43	210.74	0.036
St 9	1	SantiagoSE-100	9	12	POS533_CTD_096	10	1	1	1	1		1											12.2	12.3	22.5450	36.0763	209.39	0.288	81.511	1024.8819	1024.9343	14.89169	-23.50692	2019	3	3	18	12	45	NaN	0.031
Stt 10	1	Maio S-100	10	1	POS533_CTD_097	150											1	1					150.4	151.4	13.9794	35.5808	67.11	-0.032	0.000	1026.6451	1027.3131	15.09238	-23.18904	2019	3	3	21	39	2	66.94	0.019
Stt 10	1	Maio S-100	10	2	POS533_CTD_098	150	1	1	1	1													150.1	151.1	13.9771	35.5809	67.11	-0.034	0.000	1026.6457	1027.3124	15.09238	-23.18903	2019	3	3	21	39	6	NaN	-0.002
Stt 10	1	Maio S-100	10	3	POS533_CTD_099	90											1	1					91.7	92.2	17.2060	35.9163	93.07	0.251	0.000	1026.1720	1026.5738	15.09248	-23.18888	2019	3	3	21	41	32	92.56	0.021
Stt 10	1	Maio S-100	10	4	POS533_CTD_100	90	1	1	1	1													91.8	92.3	17.2063	35.9149	94.75	0.204	0.000	1026.1709	1026.5731	15.09247	-23.18888	2019	3	3	21	41	34	NaN	0.012
Stt 10	1	Maio S-100	10	5	POS533_CTD_101	75											1	1					76.2	76.6	20.5066	36.1301	161.96	0.924	0.000	1025.4925	1025.8221	15.09246	-23.18882	2019	3	3	21	42	33	162.98	0.081
Stt 10	1	Maio S-100	10	6	POS533_CTD_102	75	1																76.4	76.8	20.5033	36.1301	161.69	0.907	0.000	1025.4934	1025.8239	15.09246	-23.18882	2019	3	3	21	42	34	NaN	0.008
Stt 10	1	Maio S-100	10	7	POS533_CTD_103	65											1	1					67.0	67.4	21.2561	36.1690	181.38	1.194	0.000	1025.3174	1025.6066	15.09244	-23.18876	2019	3	3	21	43	38	179.33	0.026
Stt 10	1	Maio S-100	10	8	POS533_CTD_104	65	1																66.8	67.2	21.2516	36.1667	183.47	1.261	0.000	1025.3169	1025.6050	15.09244	-23.18876	2019	3	3	21	43	42	NaN	0.036
Stt 10	1	Maio S-100	10	9	POS533_CTD_105	45											1	1					47.0	47.2	22.2709	35.9380	197.45	0.789	0.000	1024.8569	1025.0590	15.09238	-23.18874	2019	3	3	21	45	2	190.88	0.035
Stt 10	1	Maio S-100	10	10	POS533_CTD_106	45	1	1	1	1													46.9	47.2	22.2743	35.9379	197.73	0.736	0.000	1024.8559	1025.0578	15.09238	-23.18874	2019	3	3	21	45	6	NaN	0.030
Stt 10	1	Maio S-100	10	11	POS533_CTD_107	10											1	1					12.5	12.5	23.1950	35.9325	212.15	0.212	0.000	1024.5852	1024.6386	15.09230	-23.18878	2019	3	3	21	46	38	211.62	0.024
Stt 10	1	Maio S-100	10	12	POS533_CTD_108	10	1	1	1	1													12.5	12.6	23.1917	35.9322	212.13	0.207	0.000	1024.5859	1024.6395	15.09230	-23.18878	2019	3	3	21	46	41	NaN	0.029
St 11	1	Maio W-100	11	1	POS533_CTD_109	350											1	1					348.0	350.3	11.6530	35.3675	50.29	-0.019	0.000	1026.9493	1028.5087	15.13294	-23.23694	2019	3	3	23	28	11	50.69	-0.005
St 11	1	Maio W-100	11	2	POS533_CTD_110	350	1	1	1	1	1												348.2	350.5	11.6518	35.3676	50.31	-0.029	0.000	1026.9496	1028.5098	15.13294	-23.23694	2019	3	3	23	28	13	NaN	0.000
St 11	1	Maio W-100	11	3	POS533_CTD_111	90											1	1	1	1	1	1	91.3	91.8	16.8170	35.8911	89.17	0.167	0.000	1026.2457	1026.6463	15.13310	-23.23662	2019	3	3	23	33	25	87.39	-0.001
St 11	1	Maio W-100	11	4	POS533_CTD_112	90	1	1	1	1	1												91.5	92.1	16.8164	35.8905	89.11	0.157	0.000	1026.2454	1026.6470	15.13308	-23.23660	2019	3	3	23	33	26	NaN	-0.000
St 11	1	Maio W-100	11	5	POS533_CTD_113	70											1	1	1	1	1	1	71.4	71.9	17.8817	36.0104	101.60	0.260	0.000	1026.0786	1026.3909	15.13314	-23.23656	2019	3	3	23	34	54	98.61	-0.008
St 11	1	Maio W-100	11	6	POS533_CTD_114	70	1	1	1	1	1												71.5	71.9	17.8821	36.0104	101.53	0.257	0.000	1026.0785	1026.3908	15.13314	-23.23656	2019	3	3	23	34	56	NaN	-0.004
St 11	1	Maio W-100	11	7	POS533_CTD_115	35											1	1	1	1	1	1	36.8	37.1	22.2216	35.9629	194.72	0.926	0.000	1024.8892	1025.0478	15.13322	-23.23651	2019	3	3	23	36	36	192.39	0.031
St 11	1	Maio W-100	11	8	POS533_CTD_116	35	1	1	1	1	1												36.8	37.0	22.2027	35.9638	195.33	0.951	0.000	1024.8952	1025.0535	15.13322	-23.23651	2019	3	3	23	36	38	NaN	0.030
St 11	1	Maio W-100	11	9	POS533_CTD_117	25											1	1	1	1	1	1	27.4	27.6	23.1413	35.9302	211.65	0.223	0.000	1024.6000	1024.7176	15.13324	-23.23646	2019	3	3	23	37	23	209.97	0.023
St 11	1	Maio W-100	11	10	POS533_CTD_118	25	1	1	1	1	1												27.6	27.7	23.1391	35.9302	211.66	0.208	0.000	1024.6006	1024.7189	15.13325	-23.23647	2019	3	3	23	37	24	NaN	0.027
St 11	1	Maio W-100	11	11	POS533_CTD_119	10											1	1	1	1	1	1	12.7	12.8	23.1480	35.9329	211.68	0.231	0.000	1024.5991	1024.6536	15.13328	-23.23642	2019	3	3	23	38	19	211.13	0.023
St 11	1	Maio W-100	11	12	POS533_CTD_120	10	1	1	1	1	1												12.8	12.8	23.1471	35.9329	212.35	0.236	0.000	1024.5994	1024.6542	15.13328	-23.23642	2019	3	3	23	38	20	NaN	0.035
St 12	1	Boavista S-100	12	1	POS533_CTD_121	40											1	1	1	1	1	1	39.9	40.2	21.7748	36.2004	208.80	0.798	2.431	1025.1958	1025.3678	15.95458	-22.97676	2019	3	4	8	29	36	210.23	0.061
St 12	1	Boavista S-100	12	2	POS533_CTD_122	40	1	1	1	1	1	1	1		1								39.9	40.2	21.7788	36.2006	208.95	0.803	2.442	1025.1948	1025.3668	15.95458	-22.97676	2019	3	4	8	29	37	NaN	0.058

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
No.	Cast	Station Name					300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
St 12	1	Boavista S-100	12	3	POS533_CTD_123	30											1	1	1	1	1		30.8	31.0	22.0716	36.1883	216.90	0.292	4.803	1025.1026	1025.2352	15.95462	-22.97672	2019	3	4	8	30	29	215.60	0.033
St 12	1	Boavista S-100	12	4	POS533_CTD_124	30		1	1	1	1	1	1		1								30.5	30.7	22.0722	36.1883	216.26	0.316	5.026	1025.1024	1025.2337	15.95462	-22.97671	2019	3	4	8	30	31	NaN	0.034
St 12	1	Boavista S-100	12	5	POS533_CTD_125	20											1	1	1	1	1		20.4	20.5	22.0718	36.1883	217.10	0.310	9.905	1025.1020	1025.1897	15.95464	-22.97666	2019	3	4	8	31	19	216.91	0.035
St 12	1	Boavista S-100	12	6	POS533_CTD_126	20		1	1	1	1	1	1		1								20.2	20.3	22.0715	36.1884	217.48	0.317	10.602	1025.1021	1025.1890	15.95462	-22.97666	2019	3	4	8	31	20	NaN	0.036
St 12	1	Boavista S-100	12	7	POS533_CTD_127	10											1	1	1	1	1		11.1	11.1	22.0707	36.1885	217.43	0.312	13.305	1025.1019	1025.1495	15.95465	-22.97665	2019	3	4	8	32	4	216.34	0.047
St 12	1	Boavista S-100	12	8	POS533_CTD_128	10	1	1	1	1	1	1	1		1								11.2	11.3	22.0708	36.1884	217.22	0.310	12.935	1025.1018	1025.1500	15.95466	-22.97666	2019	3	4	8	32	5	NaN	0.049
St 12	1	Boavista S-100	12	9	POS533_CTD_129	8	1	1									1	1					8.8	8.8	22.0691	36.1883	217.14	0.269	15.464	1025.1021	1025.1399	15.95466	-22.97664	2019	3	4	8	32	31	217.42	0.033
St 12	1	Boavista S-100	12	10	POS533_CTD_130	6	1	1	1	1	1						1						6.3	6.4	22.0708	36.1883	217.28	0.315	20.022	1025.1015	1025.1288	15.95465	-22.97660	2019	3	4	8	32	57	216.77	0.051
St 12	1	Boavista S-100	12	11	POS533_CTD_131	4	1	1									1	1					4.1	4.1	22.0639	36.1886	217.20	0.268	27.503	1025.1035	1025.1211	15.95464	-22.97658	2019	3	4	8	33	18	217.93	0.040
St 12	1	Boavista S-100	12	12	POS533_CTD_132	2	1	1	1	1	1	1	1		1		1						2.7	2.7	22.0673	36.1885	216.92	0.306	40.074	1025.1024	1025.1138	15.95464	-22.97656	2019	3	4	8	33	42	216.80	0.070
St 13	1	Boavista W-100	13	1	POS533_CTD_133	35											1	1					35.0	35.2	21.6497	36.2577	216.75	0.987	6.055	1025.2741	1025.4249	16.14040	-22.97242	2019	3	4	11	31	58	217.56	0.268
St 13	1	Boavista W-100	13	2	POS533_CTD_134	35	1	1	1	1	1	1			1								34.8	35.0	21.6496	36.2578	216.93	1.002	6.256	1025.2741	1025.4241	16.14040	-22.97242	2019	3	4	11	31	59	NaN	0.264
St 13	1	Boavista W-100	13	3	POS533_CTD_135	30											1	1	1	1	1	1	30.1	30.3	21.6741	36.2560	217.91	1.037	9.833	1025.2657	1025.3955	16.14040	-22.97236	2019	3	4	11	32	54	217.34	0.254
St 13	1	Boavista W-100	13	4	POS533_CTD_136	30	1	1	1	1	1	1			1								30.4	30.6	21.6685	36.2562	218.01	1.027	9.683	1025.2674	1025.3983	16.14040	-22.97236	2019	3	4	11	32	56	NaN	0.278
St 13	1	Boavista W-100	13	5	POS533_CTD_137	20											1	1	1	1	1		20.0	20.1	21.7148	36.2523	218.92	1.103	21.523	1025.2509	1025.3373	16.14038	-22.97221	2019	3	4	11	33	56	219.05	0.199
St 13	1	Boavista W-100	13	6	POS533_CTD_138	20	1	1	1	1	1	1			1	1							20.2	20.3	21.7159	36.2524	218.79	1.058	21.835	1025.2507	1025.3379	16.14038	-22.97221	2019	3	4	11	33	58	NaN	0.222
St 13	1	Boavista W-100	13	7	POS533_CTD_139	20											1	1	1	1	1		9.9	10.0	21.7541	36.2498	219.32	0.950	30.263	1025.2375	1025.2803	16.14034	-22.97212	2019	3	4	11	35	0	219.06	0.185
St 13	1	Boavista W-100	13	8	POS533_CTD_140	10	1	1	1	1	1	1			1	1							10.2	10.3	21.7563	36.2495	219.33	0.913	29.717	1025.2367	1025.2806	16.14034	-22.97210	2019	3	4	11	35	2	NaN	0.172
St 13	1	Boavista W-100	13	9	POS533_CTD_141	6											1	1	1	1	1		5.6	5.6	21.7727	36.2494	219.09	0.638	47.084	1025.2317	1025.2559	16.14025	-22.97200	2019	3	4	11	35	55	218.79	0.154
St 13	1	Boavista W-100	13	10	POS533_CTD_142	6	1	1	1	1	1	1			1								5.3	5.3	21.7727	36.2493	219.44	0.609	47.570	1025.2317	1025.2544	16.14024	-22.97200	2019	3	4	11	35	56	NaN	0.128
St 13	1	Boavista W-100	13	11	POS533_CTD_143	5											1						4.5	4.6	21.7723	36.2494	219.42	0.612	55.887	1025.2317	1025.2513	16.14012	-22.97187	2019	3	4	11	37	1	219.41	0.165
St 13	1	Boavista W-100	13	12	POS533_CTD_144	5	1	1	1	1	1	1			1	1							4.0	4.0	21.7699	36.2493	219.26	0.608	64.409	1025.2324	1025.2494	16.14012	-22.97186	2019	3	4	11	37	3	NaN	0.156
St 14	1	Sal SW-100	14	1	POS533_CTD_145	30											1	1	1	1	1		30.3	30.5	21.3918	36.3318	214.54	0.858	10.856	1025.4019	1025.5327	16.61510	-22.95572	2019	3	4	16	36	47	216.04	0.189
St 14	1	Sal SW-100	14	2	POS533_CTD_146	30	1	1	1	1	1												30.4	30.6	21.3837	36.3312	214.29	0.849	10.558	1025.4037	1025.5349	16.61512	-22.95572	2019	3	4	16	36	49	NaN	0.198
St 14	1	Sal SW-100	14	3	POS533_CTD_147	30																	29.8	30.0	21.4052	36.3331	213.04	0.944	11.787	1025.3992	1025.5278	16.61504	-22.95563	2019	3	4	16	37	45	NaN	0.166
St 14	1	Sal SW-100	14	4	POS533_CTD_148	30																	29.7	29.9	21.4096	36.3331	212.79	0.908	11.999	1025.3979	1025.5260	16.61504	-22.95562	2019	3	4	16	37	48	NaN	0.166
St 14	1	Sal SW-100	14	5	POS533_CTD_149	20											1	1	1	1	1		19.8	19.9	21.6254	36.3505	219.32	0.848	40.256	1025.3506	1025.4360	16.61506	-22.95556	2019	3	4	16	38	28	217.85	0.298
St 14	1	Sal SW-100	14	6	POS533_CTD_150	20	1	1	1	1	1												19.9	20.0	21.6259	36.3507	219.89	0.859	40.099	1025.3506	1025.4365	16.61506	-22.95556	2019	3	4	16	38	30	NaN	0.313
St 14	1	Sal SW-100	14	7	POS533_CTD_151	20																	20.2	20.3	21.6264	36.3507	219.75	0.841	38.952	1025.3505	1025.4375	16.61506	-22.95556	2019	3	4	16	38	31	NaN	0.332
St 14	1	Sal SW-100	14	8	POS533_CTD_152	20																	20.4	20.5	21.6267	36.3507	220.08	0.842	37.801	1025.3505	1025.4385	16.61506	-22.95556	2019	3	4	16	38	33	NaN	0.314
St 14	1	Sal SW-100	14	9	POS533_CTD_153	10											1	1	1	1	1		10.3	10.3	21.6318	36.3511	220.03	0.774	172.050	1025.3488	1025.3930	16.61506	-22.95552	2019	3	4	16	39	12	220.42	0.320
St 14	1	Sal SW-100	14	10	POS533_CTD_154	10	1	1	1	1	1												10.1	10.2	21.6289	36.3508	220.06	0.781	174.940	1025.3494	1025.3930	16.61504	-22.95550	2019	3	4	16	39	13	NaN	0.306
St 14	1	Sal SW-100	14	11	POS533_CTD_155	10																	10.1	10.2	21.6260	36.3506	220.08	0.798	174.820	1025.3500	1025.3936	16.61504	-22.95550	2019	3	4	16	39	15	NaN	0.294
St 14	1	Sal SW-100	14	12	POS533_CTD_156	10																	10.2	10.2	21.6269	36.3508	219.98	0.845	172.550	1025.3499	1025.3937	16.61504	-22.95550	2019	3	4	16	39	16	NaN	0.253
St 15	1	Sal NW-100	15	1	POS533_CTD_157	515	1	1	1	1	1	1	1	1	1	1	1	1					516.4	520.1	9.1509	35.1027	71.73	-0.031	0.000	1027.1836	1029.5232	16.67952	-23.02834	2019	3	4	18	15	9	71.95	-0.002
St 15	1	Sal NW-100	15	2	POS533_CTD_158	350	1	1	1	1	1	1	1	1	1	1	1	1					347.7	350.1	11.0971	35.3105	56.05	-0.023	0.000	1027.0077	1028.5700	16.67962	-23.02826	2019	3	4	18	19	15	57.34	-0.001
St 15	1	Sal NW-100	15	3	POS533_CTD_159	200											1	1					196.6	197.8	13.1160	35.5469	67.30	-0.030	0.000	1026.7989	1027.6749	16.67973	-23.02815	2019	3	4	18	24	26	67.57	-0.010
St 15	1	Sal NW-100	15	4	POS533_CTD_160	200	1	1	1	1	1	1	1	1	1	1							196.1	197.4	13.1300	35.5480	67.25	-0.029	0.000	1026.7969	1027.6709	16.67974	-23.02816	2019	3	4	18	24	27	NaN	0.011
St 15	1	Sal NW-100	15	5	POS533_CTD_161	90											1	1	1	1	1		89.5	90.0	18.4231	36.2337	123.22	0.085	0.015	1026.1154	1026.5054	16.67978	-23.02816	2019	3	4	18	27	4	123.93	-0.000
St 15	1	Sal NW-100	15	6	POS533_CTD_162	90	1	1	1	1	1	1	1	1	1	1							89.4	89.9	18.4300	36.2340	122.94	0.089	0.015	1026.1139	1026.5035	16.67976	-23.02816	2019	3	4	18	27	5	NaN	-0.000
St 15	1	Sal NW-100	15	7	POS533_CTD_163	50											1	1	1	1	1	1	52.1	52.4	21.5550	36.3642	215.67	0.905	0.879	1025.3824	1025.6072	16.67979	-23.02814	2019	3	4	18	28	9	215.95	0.095
St 15	1	Sal NW-100	15	8	POS533_CTD_164	50	1	1	1	1	1	1	1	1	1	1							52.0	52.3	21.5546	36.3643	216.07	1.046	0.917	1025.3826	1025.6069	16.67978	-23.02812	2019	3	4	18	28	11	NaN	0.059
St 15	1	Sal NW-100	15	9	POS533_CTD_165	30											1	1	1	1	1		32.4	32.6	21.6930	36.3504	216.88	0.837	5.562	1025.3323	1025.4720	16.67976	-23.02806	2019	3	4	18	29	19	217.76	0.029
St 15	1	Sal NW-100	15	10	POS533_CTD_166	30	1	1	1	1	1	1	1	1	1	1							32.8	33.0	21.6913	36.3499	216.85	0.842	5.289	1025.3325	1025.4737	16.67976	-23.02806	2019	3	4	18	29	21	NaN	0.028
St 15	1	Sal NW-100	15	11	POS533_CTD_167	10											1	1	1	1	1		10.5	10.5	21.7416	36.3511	219.49	0.774	52.982	1025.3181	1025.3631	16.67982	-23.02808	2019	3	4	18	32	0	220.80	0.030
St 15	1	Sal NW-100	15	12	POS533_CTD_168	10	1	1	1	1	1	1	1	1	1	1							10.3	10.3	21.7405	36.3511	219.57	0.784	52.847	1025.3184	1025.3626	16.67982	-23.02810	2019	3	4	18	32	1	NaN	0.031
St 16	1	CVAO-100	16	1	POS533_CTD_169	120											1	1	1	1	1		122.4	123.1	15.4077	35.9333	95.46	-0.023	0.063	1026.6051	1027.1451	16.89168	-24.85187	2019	3	5	10	15	33	96.28	0.003
St 16	1	CVAO-100	16	2	POS533_CTD_170	120	1	1	1	1	1	1											122.0	122.8	15.4486	35.9388	94.58	-0.035	0.064	1026.6001	1027.1385	16.89170	-24.85187	2019	3	5	10	15	35	NaN	-0.000
St 16	1	CVAO-100	16	3	POS533_CTD_171	70											1	1	1	1	1		72.2	72.7	18.4872	36.3416	135.22	0.192	1.482	1026.1811	1026.4959	16.89162	-24.85196	2019	3	5	10	18	4	140.00	0.009
St 16	1	CVAO-100	16	4	POS533_CTD_172	70	1	1	1	1	1	1											72.4	72.8	18.4949	36.3412	134.86	0.210	1.482	1026.1789	1026.4942	16.89162	-24.85196	2019	3	5	10	18	6	NaN	0.012
St 16	1	CVAO-100	16	5	POS533_CTD_173	50											1	1	1	1	1	1	52.8	53.1	22.0587	36.4961	208.71	0.538	6.110	1025.3415	1025.5687	16.89168	-24.85187	2019	3	5	10	19	50	210.04	0.028
St 16	1	CVAO-100	16	6	POS533_CTD_174	50	1	1	1	1	1	1											53.3	53.6	22.0449	36.4961	208.32	0.589	5.930	1025.3455	1025.5748	16.89168	-24.85188	2019	3	5	10	19	54	NaN	0.021
St 16	1	CVAO-100	16	7	POS533_CTD_175	25											1	1	1	1	1		27.9	28.1	22.1952	36.4969	213.30	0.607	26.716	1025.3021	1025.4222	16.89176	-24.85180	2019	3	5	10	21	22	215.27	0.019
St 16	1	CVAO-100	16	8	POS533_CTD_176	25	1	1	1	1	1	1											28.1	28.3	22.1948	36.4968	213.70	0.586	25.163	1025.3022	1025.4230	16.89176	-24.85180	2019	3	5	10	21	24	NaN	0.026
St 16	1	CVAO-100	16	9	POS533_CTD_177	10											1	1	1	1	1		13.4	13.5	22.2121	36.4946	214.34	0.481	25.491	1025.2947	1025.3524	16.89180	-24.85178	2019	3	5	10	22	24	213.80	0.038
St 16	1	CVAO-100	16	10	POS533_CTD_178	10	1	1	1	1	1	1											13.6	13.7	22.2106	36.4947	214.80	0.490	24.532	1025.2952	1025.3539	16.89180	-24.85178	2019	3	5	10	22	26	NaN	0.027
St 16	1	CVAO-100	16	11	POS533_CTD_179	5											1	1					8.6	8.6	22.2169	36.4947	214.38	0.344	30.531	1025.2931	1025.3301	16.89182	-24.85176	2019	3	5	10	23	6	215.49	0.031
St 16	1	CVAO-100	16	12	POS533_CTD_180	5	1	1	1	1	1	1											8.2	8.2	22.2119	36.4948	214.53	0.350	33.401	1025.2946	1025.3298	16.89182	-24.85176	2019	3	5	10	23	15	NaN	0.028
St 17	1	CVOO-3200	17	1	POS533_CTD_181	450	1	1	1	1	1						1	1					448.6	451.8	11.1206	35.3646	63.69	-0.022	0.000	1027.0480	1029.0618	17.58205	-24.28272	2019	3	5	19	48	59	62.65	-0.010
St 17	1	CVOO-3200	17	2	POS533_CTD_182	350	1	1	1	1	1	1	1				1	1					329.3	331.6	12.7396	35.5721	69.21	-0.041	0.000	1026.8977	1028.3661	17.58232	-24.28274	2019	3	5	19	51	40	68.55	-0.004
St 17	1	CVOO-3200	17	3	POS533_CTD_183	250	1	1	1	1	1						1	1					248.2	249.8	13.6209	35.6694	71.09	-0.035	0.000	1026.7917	1027.8945	17.58240	-24.28272	2019	3	5	19	54	16	71.37	-0.007
St 17	1	CVOO-3200	17	4	POS533_CTD_184	200	1	1	1	1	1						1	1					170.4	171.5	15.5233	35.9787	93.17	-0.039	0.000	1026.6158	1027.3671	17.58262	-24.28264	2019	3	5	19	56	28	95.25	-0.012
St 17	1	CVOO-3200	17	5	POS533_CTD_185	150	1	1	1	1	1						1	1					158.5	159.5	15.3245	35.8833	84.44	-0.028	0.000	1026.5865	1027.2861	17.58272	-24.28254	2019	3	5	19	57	31	84.35	0.001
St 17	1	CVOO-3200	17	6	POS533_CTD_186	120	1	1	1	1	1						1	1					115.9	116.7	16.9663	36.1695	98.99	-0.004	0.000	1026.4250	1026.9333	17.58294	-24.28248	2019	3	5	20	0	9	98.87	-0.010
St 17	1	CVOO-3200	17	7	POS533_CTD_187	100											1	1	1	1	1	1	98.5	99.2	18.0346	36.3002	107.14	0.076	0.000	1026.2640	1026.6942	17.58302	-24.28256	2019	3	5	20	1	31	106.34	0.003
St 17	1	CVOO-3200	17	8	POS533_CTD_188	80											1	1	1	1	1	1	89.4	90.0	18.6459	36.3177	115.23	0.288	0.000	1026.1234	1026.5128	17.58304	-24.28260	2019	3	5	20	2	16	115.76	0.009
St 17	1	CVOO-3200	17	9	POS533_CTD_189	60											1	1	1	1	1	1	69.6	70.0	20.1465	36.3648	151.27	0.707	0.000	1025.7677	1026.0690	17.58300	-24.28258	2019	3	5	20	3	49	156.27	0.008

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
No.	Cast	Station Name																																							
St 17	1	CVOO-3200	17	10	POS533_CTD_190	40											1	1	1	1	1	1	43.4	43.7	22.0957	36.5296	215.20	0.235	0.000	1025.3560	1025.5427	17.58308	-24.28258	2019	3	5	20	4	50	212.56	0.014
St 17	1	CVOO-3200	17	11	POS533_CTD_191	20											1	1	1	1	1	1	19.3	19.4	22.2514	36.5200	215.39	0.133	0.000	1025.3032	1025.3862	17.58316	-24.28262	2019	3	5	20	6	2	216.29	0.016
St 17	1	CVOO-3200	17	12	POS533_CTD_192	10											1	1	1	1	1	1	10.8	10.8	22.2463	36.5203	216.17	0.133	0.000	1025.3044	1025.3508	17.58316	-24.28267	2019	3	5	20	6	50	215.72	0.015
St 17	2	CVOO-3200	18	1	POS533_CTD_193	3500	1	1	1	1	1						1	1					3497.4	3547.9	2.4902	34.9084	235.07	-0.044	0.000	1027.8827	1043.8993	17.58564	-24.27974	2019	3	5	22	8	33	234.75	-0.017
St 17	2	CVOO-3200	18	2	POS533_CTD_194	3000	1	1	1	1	1						1	1					3002.5	3042.4	2.7290	34.9300	238.30	-0.041	0.000	1027.8758	1041.6648	17.58521	-24.27952	2019	3	5	22	18	43	237.71	-0.019
St 17	2	CVOO-3200	18	3	POS533_CTD_195	2000	1	1	1	1	1	1					1	1					2003.0	2024.8	3.6932	34.9809	221.43	-0.036	0.000	1027.8192	1037.0451	17.58627	-24.27828	2019	3	5	22	36	56	222.39	-0.016
St 17	2	CVOO-3200	18	4	POS533_CTD_196	1500	1	1	1	1	1	1					1	1					1501.2	1515.8	4.7149	35.0186	191.81	-0.046	0.000	1027.7376	1034.6420	17.58652	-24.27762	2019	3	5	22	47	10	190.94	-0.010
St 17	2	CVOO-3200	18	5	POS533_CTD_197	1000	1	1	1	1	1						1	1					1000.6	1009.1	6.4916	34.9987	133.99	-0.041	0.000	1027.5001	1032.0777	17.58647	-24.27744	2019	3	5	22	56	41	132.80	-0.009
St 17	2	CVOO-3200	18	6	POS533_CTD_198	600	1	1	1	1	1	1					1	1					602.0	606.5	8.7365	35.0689	76.47	-0.029	0.000	1027.2248	1029.9561	17.58663	-24.27716	2019	3	5	23	5	31	75.10	-0.011
St 17	2	CVOO-3200	18	7	POS533_CTD_199	100	1	1	1	1	1						1	1					97.6	98.2	16.8910	36.1556	97.90	-0.007	0.000	1026.4316	1026.8598	17.58650	-24.27674	2019	3	5	23	15	44	97.08	-0.001
St 17	2	CVOO-3200	18	8	POS533_CTD_200	80	1	1	1	1	1	1					1	1					78.8	79.3	18.0525	36.2978	107.31	0.081	0.000	1026.2568	1026.6010	17.58648	-24.27666	2019	3	5	23	16	56	107.20	-0.008
St 17	2	CVOO-3200	18	9	POS533_CTD_201	60	1	1	1	1	1						1	1					58.4	58.8	19.9769	36.3553	145.46	0.549	0.000	1025.8050	1026.0581	17.58646	-24.27662	2019	3	5	23	18	8	148.94	0.003
St 17	2	CVOO-3200	18	10	POS533_CTD_202	40	1	1	1	1	1	1					1	1					38.4	38.7	22.0950	36.5278	215.30	0.248	0.000	1025.3545	1025.5199	17.58653	-24.27655	2019	3	5	23	19	37	210.48	0.008
St 17	2	CVOO-3200	18	11	POS533_CTD_203	20	1	1	1	1	1						1	1					19.8	19.9	22.1939	36.5209	216.47	0.167	0.000	1025.3202	1025.4053	17.58649	-24.27649	2019	3	5	23	20	41	216.91	0.002
St 17	2	CVOO-3200	18	12	POS533_CTD_204	10	1	1	1	1	1	1					1	1					9.2	9.3	22.1908	36.5205	216.70	0.188	0.000	1025.3202	1025.3599	17.58646	-24.27644	2019	3	5	23	21	33	216.90	0.013
St 18	1	Trans. C9-600	19	1	POS533_CTD_205	400	1	1	1	1	1				1		1	1					403.1	406.1	13.1308	35.7660	139.33	-0.041	0.000	1026.9717	1028.7653	27.33136	-16.69484	2019	3	11	1	25	1	139.86	-0.009
St 18	1	Trans. C9-600	19	2	POS533_CTD_206	300	1	1	1	1	1	1	1		1		1	1					297.7	299.9	14.8825	36.0419	170.51	-0.030	0.000	1026.8117	1028.1273	27.33088	-16.69486	2019	3	11	1	27	51	171.30	-0.013
St 18	1	Trans. C9-600	19	3	POS533_CTD_207	100											1	1	1	1	1		101.8	102.5	18.6416	36.6861	228.68	0.414	0.000	1026.4071	1026.8506	27.33073	-16.69478	2019	3	11	1	31	53	227.81	0.031
St 18	1	Trans. C9-600	19	4	POS533_CTD_208	100	1	1	1	1	1	1	1		1								102.5	103.2	18.6413	36.6861	227.87	0.424	0.000	1026.4072	1026.8539	27.33074	-16.69479	2019	3	11	1	31	55	NaN	0.030
St 18	1	Trans. C9-600	19	5	POS533_CTD_209	70											1	1	1	1	1		69.8	70.3	18.6534	36.6866	227.68	0.491	0.000	1026.4030	1026.7071	27.33078	-16.69476	2019	3	11	1	33	25	228.03	0.024
St 18	1	Trans. C9-600	19	6	POS533_CTD_210	70	1	1	1	1	1	1	1		1								70.1	70.6	18.6531	36.6866	227.44	0.491	0.000	1026.4031	1026.7085	27.33078	-16.69478	2019	3	11	1	33	27	NaN	0.021
St 18	1	Trans. C9-600	19	7	POS533_CTD_211	50											1	1	1	1	1	1	50.9	51.2	18.7076	36.6890	230.25	0.620	0.000	1026.3902	1026.6117	27.33076	-16.69480	2019	3	11	1	34	22	230.39	0.036
St 18	1	Trans. C9-600	19	8	POS533_CTD_212	50	1	1	1	1	1	1	1		1								50.3	50.7	18.7076	36.6890	230.31	0.616	0.000	1026.3901	1026.6095	27.33076	-16.69480	2019	3	11	1	34	24	NaN	0.029
St 18	1	Trans. C9-600	19	9	POS533_CTD_213	20											1	1	1	1	1		20.0	20.2	18.6957	36.6888	230.25	0.590	0.000	1026.3916	1026.4788	27.33063	-16.69478	2019	3	11	1	35	47	230.73	0.033
St 18	1	Trans. C9-600	19	10	POS533_CTD_214	20	1	1	1	1	1	1	1		1								20.4	20.5	18.6959	36.6888	229.92	0.552	0.000	1026.3916	1026.4803	27.33062	-16.69478	2019	3	11	1	35	49	NaN	0.028
St 18	1	Trans. C9-600	19	11	POS533_CTD_215	10											1	1	1	1	1		10.8	10.9	18.6930	36.6887	230.31	0.564	0.000	1026.3918	1026.4390	27.33055	-16.69476	2019	3	11	1	36	28	230.79	0.032
St 18	1	Trans. C9-600	19	12	POS533_CTD_216	10	1	1	1	1	1	1	1		1								11.2	11.3	18.6928	36.6888	230.41	0.545	0.000	1026.3920	1026.4407	27.33056	-16.69476	2019	3	11	1	36	29	NaN	0.029
St 19	1	Trans. C10-600	20	1	POS533_CTD_217	600	1	1			1						1	1					593.3	598.1	10.6536	35.4414	118.48	-0.038	0.000	1027.1952	1029.8625	27.47464	-17.24322	2019	3	11	5	46	18	118.78	-0.004
St 19	1	Trans. C10-600	20	2	POS533_CTD_218	350	1	1			1						1	1					347.8	350.4	14.1632	35.9287	168.72	-0.050	0.000	1026.8814	1028.4223	27.47468	-17.24304	2019	3	11	5	52	3	168.43	-0.019
St 19	1	Trans. C10-600	20	3	POS533_CTD_219	125											1	1	1	1	1		126.0	126.9	19.1519	36.7877	215.01	0.081	0.000	1026.3550	1026.9027	27.47458	-17.24298	2019	3	11	5	56	38	215.72	-0.015
St 19	1	Trans. C10-600	20	4	POS533_CTD_220	125	1	1			1												125.9	126.8	19.1528	36.7884	215.50	0.065	0.000	1026.3552	1026.9024	27.47458	-17.24299	2019	3	11	5	56	40	NaN	-0.012
St 19	1	Trans. C10-600	20	5	POS533_CTD_221	100											1	1	1	1	1		100.8	101.5	19.4318	36.8440	219.17	0.161	0.000	1026.3240	1026.7617	27.47453	-17.24296	2019	3	11	5	57	51	220.47	-0.009
St 19	1	Trans. C10-600	20	6	POS533_CTD_222	100	1	1			1												101.4	102.1	19.4278	36.8433	219.07	0.161	0.000	1026.3245	1026.7648	27.47452	-17.24296	2019	3	11	5	57	53	NaN	-0.009
St 19	1	Trans. C10-600	20	7	POS533_CTD_223	75											1	1	1	1	1	1	76.4	77.0	19.7698	36.9034	224.20	0.271	0.000	1026.2794	1026.6109	27.47452	-17.24292	2019	3	11	5	58	56	224.47	0.006
St 19	1	Trans. C10-600	20	8	POS533_CTD_224	75	1	1			1												76.6	77.1	19.7694	36.9034	224.44	0.235	0.000	1026.2795	1026.6115	27.47452	-17.24292	2019	3	11	5	58	58	NaN	-0.000
St 19	1	Trans. C10-600	20	9	POS533_CTD_225	50											1	1	1	1	1		51.6	51.9	19.7827	36.9080	224.92	0.220	0.000	1026.2782	1026.5020	27.47448	-17.24286	2019	3	11	6	0	5	224.66	-0.003
St 19	1	Trans. C10-600	20	10	POS533_CTD_226	50	1	1			1												51.0	51.3	19.7825	36.9080	225.18	0.208	0.000	1026.2783	1026.4994	27.47450	-17.24285	2019	3	11	6	0	15	NaN	-0.009
St 19	1	Trans. C10-600	20	11	POS533_CTD_227	10											1	1	1	1	1		12.7	12.8	19.7827	36.9095	225.05	0.182	0.000	1026.2775	1026.3325	27.47446	-17.24272	2019	3	11	6	2	7	225.00	-0.006
St 19	1	Trans. C10-600	20	12	POS533_CTD_228	10	1	1			1												12.5	12.6	19.7827	36.9094	225.00	0.207	0.000	1026.2774	1026.3316	27.47446	-17.24272	2019	3	11	6	2	9	NaN	0.003
St 20	1	Trans. C11-600	21	1	POS533_CTD_229	600	1	1			1						1	1					589.7	594.5	10.9848	35.5132	136.87	-0.035	0.000	1027.1918	1029.8386	27.57123	-17.64457	2019	3	11	9	18	21	138.07	-0.018
St 20	1	Trans. C11-600	21	2	POS533_CTD_230	300	1	1			1	1					1	1					296.3	298.5	14.6100	36.0030	178.64	-0.049	0.000	1026.8412	1028.1521	27.57124	-17.64296	2019	3	11	9	24	26	179.36	-0.013
St 20	1	Trans. C11-600	21	3	POS533_CTD_231	110											1	1	1	1	1		111.8	112.5	18.7745	36.6974	210.00	0.065	0.334	1026.3823	1026.8688	27.57100	-17.64194	2019	3	11	9	28	55	210.76	-0.012
St 20	1	Trans. C11-600	21	4	POS533_CTD_232	110	1	1			1	1											112.7	113.5	18.7542	36.6922	210.53	0.080	0.320	1026.3836	1026.8743	27.57101	-17.64194	2019	3	11	9	28	57	NaN	-0.007
St 20	1	Trans. C11-600	21	5	POS533_CTD_233	90											1	1	1	1	1		92.4	93.0	19.2758	36.8343	220.19	0.243	0.875	1026.3569	1026.7582	27.57094	-17.64177	2019	3	11	9	29	54	219.67	0.003
St 20	1	Trans. C11-600	21	6	POS533_CTD_234	90	1	1			1	1											92.5	93.2	19.2893	36.8381	220.19	0.256	0.874	1026.3563	1026.7584	27.57094	-17.64176	2019	3	11	9	29	56	NaN	-0.002
St 20	1	Trans. C11-600	21	7	POS533_CTD_235	70											1	1	1	1	1	1	72.7	73.2	19.4067	36.8356	221.90	0.265	2.427	1026.3228	1026.6388	27.57088	-17.64152	2019	3	11	9	30	46	222.18	-0.001
St 20	1	Trans. C11-600	21	8	POS533_CTD_236	70	1	1			1	1											73.3	73.8	19.4068	36.8364	222.11	0.227	2.355	1026.3234	1026.6419	27.57088	-17.64150	2019	3	11	9	30	48	NaN	-0.002
St 20	1	Trans. C11-600	21	9	POS533_CTD_237	40											1	1	1	1	1		43.4	43.7	19.7151	36.8990	225.44	0.234	12.871	1026.2888	1026.4770	27.57082	-17.64117	2019	3	11	9	32	1	224.38	-0.001
St 20	1	Trans. C11-600	21	10	POS533_CTD_238	40	1	1			1	1											43.6	43.9	19.7155	36.8992	225.18	0.214	12.697	1026.2889	1026.4782	27.57083	-17.64116	2019	3	11	9	32	2	NaN	0.005
St 20	1	Trans. C11-600	21	11	POS533_CTD_239	10											1	1	1	1	1		14.2	14.3	19.7198	36.9002	225.19	0.160	31.197	1026.2871	1026.3490	27.57074	-17.64084	2019	3	11	9	33	57	225.20	0.004
St 20	1	Trans. C11-600	21	12	POS533_CTD_240	10	1	1			1	1											14.0	14.1	19.7196	36.9003	225.10	0.166	28.910	1026.2872	1026.3481	27.57072	-17.64081	2019	3	11	9	33	59	NaN	0.003
St 21	1	Hiero SE-200	22	1	POS533_CTD_241	200	1	1			1						1	1					200.9	202.3	17.2012	36.4329	197.81	-0.027	0.009	1026.5744	1027.4537	27.64383	-17.95736	2019	3	11	12	32	8	197.32	-0.004
St 21	1	Hiero SE-200	22	2	POS533_CTD_242	170	1	1			1						1	1					170.8	172.0	17.9521	36.5759	205.58	0.054	0.067	1026.4990	1027.2448	27.64384	-17.95728	2019	3	11	12	33	26	203.07	-0.007
St 21	1	Hiero SE-200	22	3	POS533_CTD_243	120											1	1	1	1	1		121.4	122.3	19.4698	36.8846	224.48	0.298	0.731	1026.3461	1026.8731	27.64388	-17.95718	2019	3	11	12	34	55	224.75	0.008
St 21	1	Hiero SE-200	22	4	POS533_CTD_244	120	1	1			1												121.3	122.1	19.4698	36.8846	224.24	0.292	0.734	1026.3461	1026.8724	27.64388	-17.95718	2019	3	11	12	34	57	NaN	0.006
St 21	1	Hiero SE-200	22	5	POS533_CTD_245	90											1	1	1	1	1		89.5	90.1	19.4621	36.8826	224.48	0.331	3.345	1026.3450	1026.7337	27.64390	-17.95706	2019	3	11	12	36	23	225.14	0.004
St 21	1	Hiero SE-200	22	6	POS533_CTD_246	90	1	1			1												89.9	90.6	19.4616	36.8825	224.56	0.321	3.265	1026.3451	1026.7356	27.64390	-17.95706	2019	3	11	12	36	25	NaN	0.002
St 21	1	Hiero SE-200	22	7	POS533_CTD_247	50											1	1	1	1	1	1	50.3	50.6	19.4570	36.8829	225.05	0.337	20.732	1026.3447	1026.5631	27.64382	-17.95698	2019	3	11	12	38	1	226.42	-0.009
St 21	1	Hiero SE-200	22	8	POS533_CTD_248	50	1	1			1												50.2	50.5	19.4570	36.8829	225.43	0.343	21.090	1026.3448	1026.5628	27.64382	-17.95697	2019	3	11	12	38	4	NaN	-0.011
St 21	1	Hiero SE-200	22	9	POS533_CTD_249	30																	32.7	32.9	19.4550	36.8824	225.50	0.301	32.286	1026.3440	1026.4859	27.64377	-17.95691	2019	3	11	12	38	54	NaN	-0.006
St 21	1	Hiero SE-200	22	10	POS533_CTD_250	30	1	1			1						1	1					32.5	32.7	19.4562	36.8823	225.16	0.301	33.649	1026.3436	1026.4847	27.64378	-17.95692	2019	3	11	12	38	56	225.04	-0.000
St 21	1	Hiero SE-200	22	11	POS533_CTD_251	10											1	1	1	1	1		10.8	10.8	19.4867	36.8833	225.59	0.120	41.132	1026.3353	1026.3821	27.64378	-17.95686	2019	3	11	12	39	36	225.10	-0.007
St 21	1	Hiero SE-200	22	12	POS533_CTD_252	10	1	1			1												10.8	10.8	19.4870	36.8833	225.67	0.136	39.711	1026.3353	1026.3821	27.64379	-17.95686	2019	3	11	12	39	37	NaN	-0.000
St 22	1	Hierro NE 100	23	1	POS533_CTD_253	640	1	1			1					1	1	1					643.7	649.0	10.8880	35.5285	152.10	-0.046	0.000	1027.2225	1030.1114	27.75666	-17.89702	2019	3	11	15	15	13	152.36	-0.013
St 22	1	Hierro NE 100	23	2	POS533_CTD_254	400	1	1			1	1					1	1					397.5	400.6	13.5243	35.8443	175.27	-0.045	0.000	1026.9517	1028.7175	27.75664	-17.89666	2019	3	11	15	20	20	176.26	-0.009
St 22	1	Hierro NE 100	23	3	POS533_CTD_255	120											1	1	1	1	1		121.1	121.9	19.0037	36.7657	216.59	0.154	0.372	1026.3762	1026.9027	27.75648	-17.89636	2019	3	11	15	25	34	215.31	-0.004
St 22	1	Hierro NE 100	23	4	POS533_CTD_256	120	1	1			1	1											121.1	121.9	19.0038	36.7658	216.60	0.146	0.371	1026.3762	1026.9027	27.75648	-17.89636	2019	3	11	15	25	36	NaN	-0.004

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
No.	Cast	Station Name					300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
St 22	1	Hierro NE 100	23	5	POS533_CTD_257	90											1	1	1	1	1		92.1	92.7	19.1818	36.8041	218.76	0.179	1.470	1026.3582	1026.7584	27.75646	-17.89632	2019	3	11	15	26	40	219.35	-0.003
St 22	1	Hierro NE 100	23	6	POS533_CTD_258	90	1	1			1	1											92.0	92.6	19.1838	36.8046	219.71	0.184	1.486	1026.3581	1026.7580	27.75645	-17.89632	2019	3	11	15	26	43	NaN	-0.000
St 22	1	Hierro NE 100	23	7	POS533_CTD_259	50											1	1	1	1	1		50.5	50.9	19.3812	36.8508	222.83	0.460	13.704	1026.3400	1026.5596	27.75644	-17.89624	2019	3	11	15	27	59	224.55	0.003
St 22	1	Hierro NE 100	23	8	POS533_CTD_260	50	1	1			1	1				1							50.6	51.0	19.3808	36.8511	223.18	0.444	13.863	1026.3403	1026.5603	27.75644	-17.89622	2019	3	11	15	28	2	NaN	0.011
St 22	1	Hierro NE 100	23	9	POS533_CTD_261	20																	20.8	20.9	19.4307	36.8594	225.90	0.439	92.602	1026.3322	1026.4224	27.75634	-17.89609	2019	3	11	15	30	13	NaN	0.008
St 22	1	Hierro NE 100	23	10	POS533_CTD_262	20	1	1			1	1					1	1					21.0	21.2	19.4323	36.8594	225.54	0.429	96.071	1026.3318	1026.4231	27.75634	-17.89608	2019	3	11	15	30	15	224.73	0.010
St 22	1	Hierro NE 100	23	11	POS533_CTD_263	10											1	1	1	1	1		10.1	10.2	19.4811	36.8570	225.55	0.270	226.330	1026.3167	1026.3606	27.75634	-17.89602	2019	3	11	15	30	54	226.25	0.007
St 22	1	Hierro NE 100	23	12	POS533_CTD_264	10	1	1			1	1				1							9.9	9.9	19.4812	36.8571	225.33	0.259	221.770	1026.3167	1026.3596	27.75633	-17.89600	2019	3	11	15	30	56	NaN	0.011
St 23	1	Hierro Gom. 3000	24	1	POS533_CTD_265	200											1	1					200.5	201.9	16.2072	36.2600	185.38	-0.041	0.000	1026.6769	1027.5583	27.95862	-17.65264	2019	3	11	19	23	4	183.59	-0.009
St 23	1	Hierro Gom. 3000	24	2	POS533_CTD_266	200	1	1			1												201.1	202.5	16.2043	36.2594	185.18	-0.041	0.000	1026.6771	1027.5611	27.95862	-17.65264	2019	3	11	19	23	9	NaN	-0.016
St 23	1	Hierro Gom. 3000	24	3	POS533_CTD_267	100											1	1	1	1	1		100.4	101.1	18.0311	36.5575	192.77	0.139	0.000	1026.4622	1026.9007	27.95824	-17.65256	2019	3	11	19	25	50	193.03	-0.004
St 23	1	Hierro Gom. 3000	24	4	POS533_CTD_268	100	1	1			1				1								99.8	100.4	18.0315	36.5571	193.99	0.122	0.000	1026.4617	1026.8974	27.95822	-17.65256	2019	3	11	19	25	52	NaN	-0.003
St 23	1	Hierro Gom. 3000	24	5	POS533_CTD_269	70											1	1	1	1	1		70.7	71.2	19.0323	36.7607	213.87	0.314	0.000	1026.3626	1026.6704	27.95802	-17.65248	2019	3	11	19	27	37	214.14	-0.010
St 23	1	Hierro Gom. 3000	24	6	POS533_CTD_270	70	1	1			1				1								70.5	71.0	19.0341	36.7609	213.80	0.326	0.000	1026.3623	1026.6691	27.95802	-17.65248	2019	3	11	19	27	39	NaN	-0.004
St 23	1	Hierro Gom. 3000	24	7	POS533_CTD_271	50													1	1	1		50.8	51.1	19.4269	36.8462	223.12	0.638	0.000	1026.3246	1026.5451	27.95794	-17.65242	2019	3	11	19	28	36	NaN	-0.005
St 23	1	Hierro Gom. 3000	24	8	POS533_CTD_272	50	1	1			1												50.8	51.1	19.4273	36.8463	222.86	0.629	0.000	1026.3246	1026.5452	27.95794	-17.65242	2019	3	11	19	28	38	NaN	-0.010
St 23	1	Hierro Gom. 3000	24	9	POS533_CTD_273	30													1	1	1	1	30.1	30.3	19.4863	36.8524	226.27	0.610	0.000	1026.3127	1026.4437	27.95784	-17.65242	2019	3	11	19	29	33	NaN	0.009
St 23	1	Hierro Gom. 3000	24	10	POS533_CTD_274	30	1	1			1												30.7	30.9	19.4863	36.8524	225.54	0.607	0.000	1026.3128	1026.4461	27.95784	-17.65243	2019	3	11	19	29	35	225.32	0.000
St 23	1	Hierro Gom. 3000	24	11	POS533_CTD_275	10													1	1	1		10.4	10.4	19.4808	36.8525	226.19	0.629	0.000	1026.3133	1026.3583	27.95766	-17.65236	2019	3	11	19	30	53	NaN	0.011
St 23	1	Hierro Gom. 3000	24	12	POS533_CTD_276	10	1	1			1				1								10.6	10.7	19.4809	36.8524	226.13	0.628	0.000	1026.3133	1026.3593	27.95764	-17.65236	2019	3	11	19	30	54	NaN	0.009
St 23	2	Hierro Gom. 3000	25	1	POS533_C001	2955	1	1	1	1	1						1	1					2955.2	2996.1	2.8335	34.9419	226.60	-0.034	0.000	1027.8760	1041.4537	27.95655	-17.64998	2019	3	11	20	59	56	218.80	-0.013
St 23	2	Hierro Gom. 3000	25	2	POS533_C002	2260		1	1	1	1						1	1					2261.6	2289.2	3.6918	35.0306	221.61	-0.047	0.000	1027.8616	1038.2619	27.95518	-17.64905	2019	3	11	21	12	53	220.64	-0.013
St 23	2	Hierro Gom. 3000	25	3	POS533_C003	1800		1	1	1	1						1	1					1814.1	1834.2	4.6570	35.1349	213.14	-0.039	0.000	1027.8398	1036.1673	27.95406	-17.64842	2019	3	11	21	20	56	212.48	-0.017
St 23	2	Hierro Gom. 3000	25	4	POS533_C004	1500		1	1	1	1						1	1					1500.1	1515.7	5.8722	35.2541	196.78	-0.041	0.000	1027.7882	1034.6462	27.95317	-17.64791	2019	3	11	21	26	58	195.81	-0.016
St 23	2	Hierro Gom. 3000	25	5	POS533_C005	1200		1	1	1	1						1	1					1199.0	1210.5	7.0949	35.3218	173.22	-0.044	0.000	1027.6764	1033.1356	27.95178	-17.64765	2019	3	11	21	32	43	171.64	-0.019
St 23	2	Hierro Gom. 3000	25	6	POS533_C006	970		1	1	1	1						1	1					969.9	978.7	7.8507	35.2631	146.00	-0.034	0.000	1027.5184	1031.9263	27.95056	-17.64734	2019	3	11	21	37	16	144.25	-0.009
St 23	2	Hierro Gom. 3000	25	7	POS533_C007	725	1	1	1	1	1						1	1					725.6	731.7	9.8584	35.3836	128.46	-0.038	0.000	1027.2908	1030.5619	27.94996	-17.64678	2019	3	11	21	42	55	126.52	-0.011
St 23	2	Hierro Gom. 3000	25	8	POS533_C008	550		1	1	1	1						1	1					548.2	552.6	11.7224	35.6044	152.43	-0.043	0.000	1027.1256	1029.5785	27.94938	-17.64638	2019	3	11	21	46	55	152.32	-0.009
St 23	2	Hierro Gom. 3000	25	9	POS533_C009	420		1	1	1	1						1	1					424.5	427.8	13.0134	35.7687	162.61	-0.042	0.000	1026.9981	1028.8879	27.94902	-17.64616	2019	3	11	21	49	29	162.63	-0.013
St 23	2	Hierro Gom. 3000	25	10	POS533_C010	300	1	1	1	1	1						1	1					300.0	302.2	14.7929	36.0238	191.84	-0.041	0.000	1026.8175	1028.1435	27.94872	-17.64570	2019	3	11	21	53	20	190.27	-0.017
St 23	2	Hierro Gom. 3000	25	11	POS533_C011	50	1		1	1							1	1					53.9	54.3	19.3226	36.8196	223.49	0.638	0.000	1026.3316	1026.5659	27.94832	-17.64515	2019	3	11	21	57	52	221.56	0.010
St 23	2	Hierro Gom. 3000	25	12	POS533_C012	10	1		1	1							1	1					10.9	11.0	19.4268	36.8441	225.33	0.677	0.000	1026.3210	1026.3686	27.94806	-17.64508	2019	3	11	21	59	5	223.75	0.007
St 24	1	Gom. NW 100	26	1	POS533_C001																		82.1	82.7	19.0200	36.7532	218.10	0.356	0.000	1026.3606	1026.7177	28.15996	-17.38320	2019	3	12	2	6	46	NaN	0.045
St 24	1	Gom. NW 100	26	2	POS533_C002																		82.5	83.0	19.0164	36.7525	217.97	0.368	0.000	1026.3610	1026.7198	28.15998	-17.38320	2019	3	12	2	6	48	NaN	0.030
St 24	1	Gom. NW 100	26	3	POS533_C003																		82.6	83.1	19.0114	36.7514	217.97	0.392	0.000	1026.3615	1026.7207	28.15998	-17.38320	2019	3	12	2	6	49	NaN	0.033
St 24	1	Gom. NW 100	26	4	POS533_C004																		82.5	83.1	19.0064	36.7506	217.95	0.399	0.000	1026.3621	1026.7211	28.15998	-17.38320	2019	3	12	2	6	50	NaN	0.030
St 24	1	Gom. NW 100	26	5	POS533_C005																		82.1	82.7	19.0103	36.7514	217.80	0.404	0.000	1026.3617	1026.7191	28.15998	-17.38319	2019	3	12	2	6	52	NaN	0.028
St 24	1	Gom. NW 100	26	6	POS533_C006																		81.7	82.2	19.0218	36.7530	217.65	0.413	0.000	1026.3600	1026.7152	28.15998	-17.38318	2019	3	12	2	6	53	NaN	0.018
St 24	1	Gom. NW 100	26	7	POS533_C007																		81.2	81.8	19.0161	36.7523	217.99	0.413	0.000	1026.3609	1026.7141	28.15998	-17.38317	2019	3	12	2	6	55	NaN	0.046
St 24	1	Gom. NW 100	26	8	POS533_C008																		81.2	81.8	19.0149	36.7521	218.33	0.400	0.000	1026.3610	1026.7143	28.15998	-17.38316	2019	3	12	2	6	56	NaN	0.040
St 24	1	Gom. NW 100	26	9	POS533_C009																		81.7	82.2	19.0114	36.7515	218.19	0.362	0.000	1026.3615	1026.7169	28.15998	-17.38316	2019	3	12	2	6	57	NaN	0.026
St 24	1	Gom. NW 100	26	10	POS533_C010																		82.3	82.8	19.0141	36.7521	218.14	0.350	0.000	1026.3613	1026.7192	28.15998	-17.38316	2019	3	12	2	6	59	NaN	0.024
St 24	1	Gom. NW 100	26	11	POS533_C011																		82.6	83.2	19.0181	36.7526	217.86	0.391	0.000	1026.3607	1026.7200	28.15998	-17.38316	2019	3	12	2	7	1	NaN	0.029
St 24	1	Gom. NW 100	26	12	POS533_C012																		NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St 25	1	Gom. SW 100	27	1	POS533_C013	80											1	1	1	1	1		81.2	81.7	19.2376	36.7923	220.08	0.412	0.000	1026.3342	1026.6870	28.03758	-17.31582	2019	3	12	4	37	10	220.62	0.026
St 25	1	Gom. SW 100	27	2	POS533_C014	80	1	1	1		1	1	1		1	1							81.3	81.8	19.2376	36.7923	220.64	0.498	0.000	1026.3342	1026.6874	28.03758	-17.31582	2019	3	12	4	37	12	NaN	0.014
St 25	1	Gom. SW 100	27	3	POS533_C015	70											1	1	1	1	1		71.2	71.7	19.3913	36.8164	223.92	0.560	0.000	1026.3121	1026.6213	28.03764	-17.31593	2019	3	12	4	39	11	225.42	0.012
St 25	1	Gom. SW 100	27	4	POS533_C016	70	1	1	1		1	1	1		1	1							71.1	71.6	19.3914	36.8164	223.89	0.586	0.000	1026.3121	1026.6209	28.03764	-17.31594	2019	3	12	4	39	13	NaN	0.024
St 25	1	Gom. SW 100	27	5	POS533_C017	55											1	1	1	1	1	1	57.0	57.4	19.4212	36.8226	224.73	0.678	0.000	1026.3083	1026.5558	28.03764	-17.31598	2019	3	12	4	39	58	224.83	0.022
St 25	1	Gom. SW 100	27	6	POS533_C018	55	1	1	1		1	1	1		1	1							57.1	57.4	19.4251	36.8235	225.16	0.627	0.000	1026.3080	1026.5559	28.03764	-17.31598	2019	3	12	4	39	59	NaN	0.021
St 25	1	Gom. SW 100	27	7	POS533_C019	30											1	1	1	1	1		32.5	32.7	19.6749	36.8756	226.14	0.295	0.000	1026.2811	1026.4221	28.03766	-17.31603	2019	3	12	4	41	0	225.89	0.006
St 25	1	Gom. SW 100	27	8	POS533_C020	30	1	1	1		1	1	1		1	1							32.5	32.8	19.6746	36.8756	225.50	0.305	0.000	1026.2811	1026.4223	28.03766	-17.31602	2019	3	12	4	41	2	NaN	0.013
St 25	1	Gom. SW 100	27	9	POS533_C021	10											1	1					12.4	12.5	19.8761	36.8911	225.58	0.173	0.000	1026.2386	1026.2924	28.03766	-17.31606	2019	3	12	4	42	4	225.73	0.003
St 25	1	Gom. SW 100	27	10	POS533_C022	10	1	1	1		1	1	1		1	1							12.4	12.5	19.8748	36.8909	225.54	0.153	0.000	1026.2389	1026.2928	28.03766	-17.31606	2019	3	12	4	42	7	NaN	0.004
St 25	1	Gom. SW 100	27	11	POS533_C023	5											1	1					5.5	5.6	20.0652	36.8855	225.46	0.170	0.015	1026.1837	1026.2077	28.03764	-17.31610	2019	3	12	4	43	12	225.53	0.007
St 25	1	Gom. SW 100	27	12	POS533_C024	5	1	1	1		1	1	1		1	1							5.6	5.6	20.0628	36.8859	226.49	0.173	0.012	1026.1846	1026.2088	28.03765	-17.31610	2019	3	12	4	43	13	NaN	0.003
St 26	1	Gom. S 100	28	1	POS533_C025	80											1	1	1	1	1		81.0	81.6	19.0623	36.7653	219.13	0.248	0.000	1026.3589	1026.7113	28.01236	-17.18392	2019	3	12	6	24	23	219.46	0.006
St 26	1	Gom. S 100	28	2	POS533_C026	80	1	1			1												81.2	81.7	19.0650	36.7656	220.00	0.216	0.000	1026.3585	1026.7115	28.01236	-17.18392	2019	3	12	6	24	28	NaN	0.003
St 26	1	Gom. S 100	28	3	POS533_C027	60											1	1	1	1	1		61.3	61.7	19.1571	36.7809	220.56	0.228	0.000	1026.3454	1026.6120	28.01238	-17.18394	2019	3	12	6	25	31	220.00	0.007
St 26	1	Gom. S 100	28	4	POS533_C028	60	1				1												61.2	61.7	19.1586	36.7812	219.99	0.216	0.000	1026.3452	1026.6115	28.01238	-17.18394	2019	3	12	6	25	33	NaN	0.000
St 26	1	Gom. S 100	28	5	POS533_C029	40											1	1	1	1	1		41.6	41.9	19.3484	36.8120	221.86	0.263	0.000	1026.3185	1026.4992	28.01239	-17.18396	2019	3	12	6	26	30	221.50	0.009
St 26	1	Gom. S 100	28	6	POS533_C030	40	1	1			1												41.6	41.9	19.3520	36.8127	222.00	0.250	0.000	1026.3181	1026.4990	28.01238	-17.18396	2019	3	12	6	26	32	NaN	0.012
St 26	1	Gom. S 100	28	7	POS533_C031	20											1	1	1	1	1		41.6	41.9	19.3507	36.8125	222.16	0.295	0.000	1026.3183	1026.4992	28.01240	-17.18396	2019	3	12	6	26	40	222.07	0.004
St 26	1	Gom. S 100	28	8	POS533_C032	20	1				1												22.1	22.3	19.5366	36.8509	224.35	0.371	0.000	1026.2980	1026.3941	28.01241	-17.18394	2019	3	12	6	27	49	NaN	0.010
St 26	1	Gom. S 100	28	9	POS533_C033	20											1	1					22.2	22.4	19.5365	36.8510	224.85	0.358	0.000	1026.2981	1026.3946	28.01242	-17.18394	2019	3	12	6	27	51	224.94	0.010
St 26	1	Gom. S 100	28	10	POS533_C034	10	1	1			1												10.2	10.3	19.6086	36.8675	224.91	0.289	0.000	1026.2912	1026.3357	28.01248	-17.18398	2019	3	12	6	31	44	NaN	0.011
St 26	1	Gom. S 100	28	11	POS533_C035	10											1	1	1	1	1		10.4	10.4	19.6081	36.8675	224.93	0.293	0.000	1026.2914	1026.3364	28.01248	-17.18398	2019	3	12	6	31	49	225.75	0.008

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
No.	Cast	Station Name					300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
St 26	1	Gom. S 100	28	12	POS533_C036	2	1	1			1												2.1	2.2	19.7474	36.8798	226.10	0.210	0.100	1026.2636	1026.2729	28.01248	-17.18402	2019	3	12	6	32	48	NaN	0.005
St 27	1	Gom. E 300	29	1	POS533_C037	70											1	1	1	1	1		69.3	69.8	18.7935	36.7182	216.77	0.361	0.780	1026.3914	1026.6932	28.09950	-17.07814	2019	3	12	8	31	12	217.07	0.014
St 27	1	Gom. E 300	29	2	POS533_C038	70	1	1				1											69.2	69.7	18.7475	36.7100	217.65	0.408	0.785	1026.3969	1026.6983	28.09950	-17.07814	2019	3	12	8	31	15	NaN	0.025
St 27	1	Gom. E 300	29	3	POS533_C039	55											1	1	1	1	1		54.5	54.9	18.8265	36.7245	217.94	0.369	2.030	1026.3871	1026.6244	28.09943	-17.07796	2019	3	12	8	32	22	218.37	0.019
St 27	1	Gom. E 300	29	4	POS533_C040	55	1	1				1											54.4	54.8	18.8217	36.7239	217.76	0.365	2.056	1026.3879	1026.6248	28.09942	-17.07795	2019	3	12	8	32	23	NaN	0.023
St 27	1	Gom. E 300	29	5	POS533_C041	40											1	1	1	1	1		39.6	39.8	19.1734	36.7866	223.84	0.353	5.697	1026.3445	1026.5165	28.09938	-17.07780	2019	3	12	8	33	29	223.35	-0.008
St 27	1	Gom. E 300	29	6	POS533_C042	40	1	1				1											39.5	39.8	19.1731	36.7868	223.49	0.378	5.705	1026.3447	1026.5165	28.09938	-17.07780	2019	3	12	8	33	30	NaN	-0.004
St 27	1	Gom. E 300	29	7	POS533_C043	30											1	1	1	1	1		30.6	30.8	19.1674	36.7864	223.96	0.413	10.554	1026.3455	1026.4785	28.09932	-17.07768	2019	3	12	8	34	23	223.65	0.013
St 27	1	Gom. E 300	29	8	POS533_C044	30	1	1				1											30.5	30.7	19.1633	36.7856	224.31	0.428	10.425	1026.3459	1026.4786	28.09932	-17.07768	2019	3	12	8	34	25	NaN	0.011
St 27	1	Gom. E 300	29	9	POS533_C045	20											1	1					20.9	21.0	19.1688	36.7863	224.95	0.414	19.981	1026.3446	1026.4355	28.09924	-17.07753	2019	3	12	8	35	14	223.59	0.015
St 27	1	Gom. E 300	29	10	POS533_C046	20	1	1				1											21.0	21.2	19.1698	36.7865	224.43	0.411	19.539	1026.3445	1026.4359	28.09924	-17.07752	2019	3	12	8	35	16	NaN	0.013
St 27	1	Gom. E 300	29	11	POS533_C047	10											1	1	1	1	1		11.6	11.7	19.1674	36.7866	224.63	0.403	18.392	1026.3447	1026.3953	28.09920	-17.07742	2019	3	12	8	36	0	225.15	0.007
St 27	1	Gom. E 300	29	12	POS533_C048	10	1	1				1											11.7	11.8	19.1703	36.7870	224.13	0.405	18.631	1026.3443	1026.3952	28.09920	-17.07742	2019	3	12	8	36	1	NaN	0.031
St 28	1	Gom. Ten. 3000	30	1	POS533_C061	650	1	1			1						1	1					638.3	643.6	10.4261	35.5064	154.53	-0.030	0.000	1027.2870	1030.1585	28.24012	-17.02816	2019	3	12	10	31	5	123.45	-0.013
St 28	1	Gom. Ten. 3000	30	2	POS533_C062	325	1	1			1						1	1					322.5	324.9	13.7125	35.8607	153.68	-0.029	0.000	1026.9230	1028.3554	28.23958	-17.02692	2019	3	12	10	40	22	153.55	-0.007
St 28	1	Gom. Ten. 3000	30	3	POS533_C063	90											1	1	1	1	1		91.2	91.9	19.0015	36.7900	226.83	0.651	0.226	1026.3939	1026.7909	28.23914	-17.02628	2019	3	12	10	45	22	226.82	0.023
St 28	1	Gom. Ten. 3000	30	4	POS533_C064	90	1	1			1												91.4	92.1	19.0007	36.7902	226.15	0.690	0.224	1026.3943	1026.7921	28.23914	-17.02628	2019	3	12	10	45	25	NaN	0.014
St 28	1	Gom. Ten. 3000	30	5	POS533_C065	60											1	1	1	1	1		61.2	61.6	19.0390	36.7962	229.18	0.867	2.207	1026.3876	1026.6538	28.23893	-17.02608	2019	3	12	10	46	50	227.83	0.018
St 28	1	Gom. Ten. 3000	30	6	POS533_C066	60	1				1												61.5	61.9	19.0390	36.7962	229.19	0.825	2.163	1026.3876	1026.6552	28.23892	-17.02608	2019	3	12	10	46	51	NaN	0.024
St 28	1	Gom. Ten. 3000	30	7	POS533_C067	45											1	1	1	1	1		47.5	47.8	19.0369	36.7961	228.98	0.804	6.553	1026.3875	1026.5942	28.23878	-17.02598	2019	3	12	10	47	48	229.03	0.025
St 28	1	Gom. Ten. 3000	30	8	POS533_C068	45	1	1			1												47.0	47.3	19.0367	36.7963	229.26	0.833	6.765	1026.3876	1026.5920	28.23874	-17.02596	2019	3	12	10	47	57	NaN	0.024
St 28	1	Gom. Ten. 3000	30	9	POS533_C069	30											1	1	1	1	1	1	31.7	32.0	19.0618	36.7986	230.44	0.848	20.451	1026.3822	1026.5203	28.23860	-17.02580	2019	3	12	10	49	2	229.51	0.020
St 28	1	Gom. Ten. 3000	30	10	POS533_C070	30	1				1												31.8	32.0	19.0572	36.7984	230.29	0.823	21.375	1026.3832	1026.5216	28.23858	-17.02578	2019	3	12	10	49	14	NaN	0.025
St 28	1	Gom. Ten. 3000	30	11	POS533_C071	10											1	1	1	1	1		12.9	13.0	19.0891	36.8004	230.87	0.680	20.661	1026.3757	1026.4318	28.23852	-17.02560	2019	3	12	10	50	22	230.25	0.029
St 28	1	Gom. Ten. 3000	30	12	POS533_C072	10	1	1			1												12.7	12.8	19.0892	36.8005	230.88	0.680	21.227	1026.3756	1026.4309	28.23852	-17.02560	2019	3	12	10	50	24	NaN	0.030
St 29	1	Ten. NW 100	31	1	POS533_C073	80											1	1	1	1	1		78.7	79.2	18.4443	36.6532	213.36	0.118	6.367	1026.4308	1026.7739	28.32794	-16.93407	2019	3	12	14	58	53	214.81	0.008
St 29	1	Ten. NW 100	31	2	POS533_C074	80	1	1			1	1											78.3	78.8	18.7138	36.7059	215.17	0.165	6.346	1026.4027	1026.7438	28.32794	-16.93406	2019	3	12	14	58	59	NaN	0.010
St 29	1	Ten. NW 100	31	3	POS533_C075	60											1	1	1	1	1		60.5	60.9	19.1936	36.7937	221.74	0.345	15.184	1026.3457	1026.6088	28.32794	-16.93396	2019	3	12	15	0	9	226.18	0.006
St 29	1	Ten. NW 100	31	4	POS533_C076	60	1																60.6	61.0	19.1834	36.7943	221.38	0.355	15.437	1026.3488	1026.6123	28.32794	-16.93396	2019	3	12	15	0	10	NaN	0.006
St 29	1	Ten. NW 100	31	5	POS533_C077	50											1	1	1	1	1	1	50.6	50.9	19.5503	36.8549	225.74	0.441	25.679	1026.2989	1026.5186	28.32823	-16.93388	2019	3	12	15	1	30	227.90	0.012
St 29	1	Ten. NW 100	31	6	POS533_C078	50	1	1			1	1											51.0	51.4	19.5512	36.8552	225.45	0.423	25.496	1026.2989	1026.5204	28.32824	-16.93388	2019	3	12	15	1	32	NaN	0.005
St 29	1	Ten. NW 100	31	7	POS533_C079	30											1	1	1	1	1		31.5	31.8	19.8525	36.8981	225.15	0.152	37.143	1026.2512	1026.3880	28.32848	-16.93386	2019	3	12	15	2	24	226.53	0.001
St 29	1	Ten. NW 100	31	8	POS533_C080	30	1	1			1	1											31.5	31.7	19.8509	36.8973	225.74	0.186	35.053	1026.2510	1026.3876	28.32848	-16.93386	2019	3	12	15	2	26	NaN	0.012
St 29	1	Ten. NW 100	31	9	POS533_C081	10											1	1	1	1	1		10.1	10.1	20.0032	36.9164	225.20	0.042	209.350	1026.2241	1026.2677	28.32890	-16.93383	2019	3	12	15	3	35	224.90	0.003
St 29	1	Ten. NW 100	31	10	POS533_C082	10	1	1			1	1											10.8	10.8	20.0170	36.9173	225.21	0.048	187.800	1026.2211	1026.2678	28.32895	-16.93384	2019	3	12	15	3	40	NaN	-0.000
St 29	1	Ten. NW 100	31	11	POS533_C083	5											1	1					5.0	5.1	20.1616	36.9060	225.84	0.003	453.300	1026.1735	1026.1953	28.32928	-16.93382	2019	3	12	15	4	26	228.64	-0.005
St 29	1	Ten. NW 100	31	12	POS533_C084	5	1	1			1	1											4.5	4.5	20.1529	36.9041	226.20	-0.002	502.160	1026.1744	1026.1938	28.32928	-16.93382	2019	3	12	15	4	28	NaN	-0.000
St 30	1	Ten. W 100	32	1	POS533_C085	132	1	1			1												131.0	131.9	17.9400	36.5529	197.65	0.057	0.009	1026.4826	1027.0548	28.18494	-16.83951	2019	3	12	17	18	20	NaN	-0.005
St 30	1	Ten. W 100	32	2	POS533_C086	132											1	1					130.9	131.8	17.9551	36.5561	197.83	0.044	0.009	1026.4813	1027.0531	28.18494	-16.83952	2019	3	12	17	18	24	197.83	0.005
St 30	1	Ten. W 100	32	3	POS533_C087	100	1	1			1												101.2	101.9	18.9738	36.7677	220.46	0.461	0.131	1026.3845	1026.8249	28.18496	-16.83950	2019	3	12	17	19	11	NaN	0.019
St 30	1	Ten. W 100	32	4	POS533_C088	100											1	1	1	1	1		101.4	102.1	18.9793	36.7680	221.86	0.484	0.130	1026.3833	1026.8246	28.18497	-16.83950	2019	3	12	17	19	13	220.93	0.018
St 30	1	Ten. W 100	32	5	POS533_C089	70	1	1			1												69.5	70.0	19.0747	36.7862	225.54	0.788	1.325	1026.3711	1026.6736	28.18498	-16.83947	2019	3	12	17	20	25	NaN	0.017
St 30	1	Ten. W 100	32	6	POS533_C090	70											1	1	1	1	1		69.3	69.8	19.0782	36.7865	225.48	0.710	1.356	1026.3705	1026.6719	28.18499	-16.83948	2019	3	12	17	20	27	226.99	0.003
St 30	1	Ten. W 100	32	7	POS533_C091	55	1	1			1				1								54.4	54.8	19.1000	36.7909	224.17	0.816	3.978	1026.3675	1026.6042	28.18500	-16.83948	2019	3	12	17	21	31	NaN	0.004
St 30	1	Ten. W 100	32	8	POS533_C092	55											1	1	1	1	1	1	54.7	55.1	19.1214	36.7939	223.97	0.591	3.938	1026.3642	1026.6021	28.18500	-16.83948	2019	3	12	17	21	34	224.41	0.002
St 30	1	Ten. W 100	32	9	POS533_C093	30	1	1			1				1								30.3	30.5	19.2011	36.8046	223.55	0.496	18.705	1026.3506	1026.4824	28.18500	-16.83946	2019	3	12	17	22	23	NaN	0.004
St 30	1	Ten. W 100	32	10	POS533_C094	30											1	1	1	1	1		30.3	30.5	19.2006	36.8048	223.49	0.507	18.877	1026.3509	1026.4827	28.18500	-16.83947	2019	3	12	17	22	25	221.64	0.003
St 30	1	Ten. W 100	32	11	POS533_C095	10	1	1			1				1								10.7	10.8	19.2718	36.8107	223.88	0.477	19.936	1026.3360	1026.3827	28.18500	-16.83945	2019	3	12	17	23	23	NaN	0.014
St 30	1	Ten. W 100	32	12	POS533_C096	10											1	1	1	1	1		10.9	11.0	19.2745	36.8113	223.60	0.441	19.664	1026.3358	1026.3831	28.18500	-16.83946	2019	3	12	17	23	26	224.49	0.026
St 31	1	Ten. SW 100	33	1	POS533_C097	200	x	x			x	x	x										200.0	201.4	16.8794	36.3656	187.54	-0.016	0.000	1026.5998	1027.4765	28.02633	-16.72708	2019	3	12	20	44	28	NaN	-0.011
St 31	1	Ten. SW 100	33	2	POS533_C098	200											x	x					199.7	201.2	16.9242	36.3759	185.01	-0.030	0.000	1026.5970	1027.4726	28.02633	-16.72708	2019	3	12	20	44	30	185.93	-0.008
St 31	1	Ten. SW 100	33	3	POS533_C099	100	x	x			x	x	x										101.6	102.3	19.1793	36.7920	219.89	0.245	0.000	1026.3500	1026.7916	28.02602	-16.72695	2019	3	12	20	46	59	NaN	0.005
St 31	1	Ten. SW 100	33	4	POS533_C100	100											x	x	x	x	x		101.6	102.3	19.1768	36.7913	219.24	0.219	0.000	1026.3501	1026.7917	28.02600	-16.72694	2019	3	12	20	47	2	220.94	-0.002
St 31	1	Ten. SW 100	33	5	POS533_C101	80		x			x	x	x										81.9	82.4	19.3572	36.8185	224.09	0.314	0.000	1026.3231	1026.6788	28.02578	-16.72683	2019	3	12	20	48	43	NaN	0.014
St 31	1	Ten. SW 100	33	6	POS533_C102	80											x	x	x	x	x		81.9	82.4	19.3564	36.8183	224.38	0.379	0.000	1026.3231	1026.6787	28.02576	-16.72682	2019	3	12	20	48	51	223.39	0.006
St 31	1	Ten. SW 100	33	7	POS533_C103	55	x	x			x	x	x			x							55.0	55.4	19.6234	36.8468	226.89	0.455	0.000	1026.2737	1026.5126	28.02556	-16.72670	2019	3	12	20	50	23	NaN	0.020
St 31	1	Ten. SW 100	33	8	POS533_C104	55											x	x	x	x	x	x	54.7	55.1	19.6237	36.8467	226.65	0.559	0.000	1026.2735	1026.5112	28.02556	-16.72671	2019	3	12	20	50	25	226.36	0.009
St 31	1	Ten. SW 100	33	9	POS533_C105	30		x			x	x	x			x							30.5	30.7	19.8827	36.8768	226.48	0.229	0.000	1026.2269	1026.3590	28.02538	-16.72660	2019	3	12	20	51	44	NaN	-0.001
St 31	1	Ten. SW 100	33	10	POS533_C106	30											x	x	x	x	x		30.6	30.8	19.8881	36.8775	226.53	0.214	0.000	1026.2260	1026.3587	28.02538	-16.72660	2019	3	12	20	51	47	226.37	0.002
St 31	1	Ten. SW 100	33	11	POS533_C107	10	x	x			x	x	x			x							11.1	11.1	19.9564	36.8885	226.41	0.145	0.000	1026.2152	1026.2632	28.02520	-16.72648	2019	3	12	20	53	1	NaN	0.000
St 31	1	Ten. SW 100	33	12	POS533_C108	10											x	x	x	x	x		10.8	10.8	19.9565	36.8887	227.02	0.137	0.000	1026.2154	1026.2621	28.02520	-16.72649	2019	3	12	20	53	3	228.71	0.004
St 32	1	Ten. S 100	34	1	POS533_C109	225	1	1			1												224.2	225.9	16.7388	36.3639	201.79	-0.001	0.000	1026.6329	1027.6164	28.00792	-16.60227	2019	3	12	22	47	22	NaN	-0.009
St 32	1	Ten. S 100	34	2	POS533_C110	225											1	1					224.4	226.0	16.7499	36.3661	201.19	0.007	0.000	1026.6319	1027.6159	28.00791	-16.60226	2019	3	12	22	47	27	199.89	-0.004
St 32	1	Ten. S 100	34	3	POS533_C111	150	1				1												150.8	151.9	18.9682	36.7699	226.52	0.386	0.000	1026.3900	1027.0459	28.00770	-16.60224	2019	3	12	22	49	20	NaN	0.012
St 32	1	Ten. S 100	34	4	POS533_C112	150											1	1	1	1	1		151.0	152.0	18.9679	36.7700	226.98	0.349	0.000	1026.3901	1027.0467	28.00770	-16.60222	2019	3	12	22	49	23	225.17	0.006
St 32	1	Ten. S 100	34	5	POS533_C113	100		1															101.0	101.7	18.9809	36.7739	227.76	0.515	0.000	1026.3874	1026.8267	28.00762	-16.60218	2019	3	12	22	50	38	NaN	0.017
St 32	1	Ten. S 100	34	6	POS533_C114	100											1	1	1	1	1		101.1	101.8	18.9804	36.7737	228.19	0.527	0.000	1026.3873	1026.8270	28.00762	-16.60218	2019	3	12	22	50	42	227.60	0.011

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-PI	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 32	1	Ten. S 100	34	7	POS533_C115	50	1	1			1												50.4	50.8	19.0374	36.7826	229.01	0.554	0.000	1026.3771	1026.5966	28.00748	-16.60210	2019	3	12	22	53	4	NaN	0.005
St 32	1	Ten. S 100	34	8	POS533_C116	50											1	1	1	1	1		50.5	50.8	19.0370	36.7824	229.87	0.598	0.000	1026.3771	1026.5968	28.00748	-16.60210	2019	3	12	22	53	6	229.07	0.012
St 32	1	Ten. S 100	34	9	POS533_C117	30	1				1												30.6	30.8	19.0394	36.7835	229.90	0.616	0.000	1026.3763	1026.5093	28.00738	-16.60208	2019	3	12	22	54	15	NaN	0.014
St 32	1	Ten. S 100	34	10	POS533_C118	30											1	1	1	1	1		30.7	30.9	19.0382	36.7832	229.35	0.554	0.000	1026.3765	1026.5102	28.00738	-16.60208	2019	3	12	22	54	17	229.43	0.022
St 32	1	Ten. S 100	34	11	POS533_C119	10	1	1			1												10.9	11.0	19.0409	36.7844	230.16	0.579	0.000	1026.3757	1026.4232	28.00727	-16.60206	2019	3	12	22	55	20	NaN	0.022
St 32	1	Ten. S 100	34	12	POS533_C120	10											1	1	1	1	1		10.8	10.9	19.0410	36.7844	230.22	0.575	0.000	1026.3757	1026.4229	28.00726	-16.60206	2019	3	12	22	55	22	228.85	0.028
St 33	1	Ten. SE 100	35	1	POS533_C121	500	1	1			1	1											496.0	499.9	12.2921	35.6913	164.53	-0.036	0.000	1027.0827	1029.2967	28.14956	-16.40552	2019	3	13	1	41	6	NaN	-0.010
St 33	1	Ten. SE 100	35	2	POS533_C122	500											1	1					495.9	499.8	12.2998	35.6927	164.55	-0.061	0.000	1027.0823	1029.2958	28.14956	-16.40552	2019	3	13	1	41	12	164.96	-0.007
St 33	1	Ten. SE 100	35	3	POS533_C123	250	1	1			1	1											249.6	251.4	15.4460	36.1392	192.76	-0.041	0.000	1026.7597	1027.8603	28.14960	-16.40570	2019	3	13	1	45	57	NaN	-0.021
St 33	1	Ten. SE 100	35	4	POS533_C124	250											1	1					249.7	251.6	15.4329	36.1374	193.13	-0.039	0.000	1026.7613	1027.8626	28.14960	-16.40570	2019	3	13	1	46	1	192.84	-0.011
St 33	1	Ten. SE 100	35	5	POS533_C125	150	1	1			1	1											151.0	152.0	18.7501	36.7350	225.12	0.163	0.000	1026.4191	1027.0763	28.14952	-16.40560	2019	3	13	1	48	27	NaN	0.001
St 33	1	Ten. SE 100	35	6	POS533_C126	150											1	1	1	1	1		150.8	151.9	18.7511	36.7352	225.15	0.184	0.000	1026.4190	1027.0755	28.14950	-16.40560	2019	3	13	1	48	30	224.13	0.013
St 33	1	Ten. SE 100	35	7	POS533_C127	140	1	1			1	1											141.3	142.3	18.7766	36.7401	226.15	0.225	0.000	1026.4158	1027.0306	28.14950	-16.40558	2019	3	13	1	49	22	NaN	0.004
St 33	1	Ten. SE 100	35	8	POS533_C128	140											1	1	1	1	1	1	141.5	142.5	18.7742	36.7395	225.74	0.229	0.000	1026.4160	1027.0317	28.14950	-16.40559	2019	3	13	1	49	23	226.39	0.005
St 33	1	Ten. SE 100	35	9	POS533_C129	50	1	1			1	1											52.5	52.9	18.9172	36.7596	229.86	0.283	0.000	1026.3905	1026.6191	28.14950	-16.40556	2019	3	13	1	51	22	NaN	0.017
St 33	1	Ten. SE 100	35	10	POS533_C130	50											1	1	1	1	1		52.4	52.7	18.9173	36.7595	229.25	0.270	0.000	1026.3905	1026.6185	28.14950	-16.40556	2019	3	13	1	51	23	230.08	0.012
St 33	1	Ten. SE 100	35	11	POS533_C131	10	1	1			1	1											13.1	13.1	18.9079	36.7602	229.97	0.272	0.000	1026.3916	1026.4485	28.14948	-16.40550	2019	3	13	1	52	37	NaN	0.032
St 33	1	Ten. SE 100	35	12	POS533_C132	10											1	1	1	1	1		12.8	12.9	18.9081	36.7602	229.88	0.283	0.000	1026.3915	1026.4474	28.14948	-16.40550	2019	3	13	1	52	39	230.82	0.025
St 34	1	Ten. E 100	36	1	POS533_C145	450	1	1		1	1					1							445.9	449.4	12.5314	35.7185	167.04	-0.040	0.000	1027.0557	1029.0448	28.31594	-16.33924	2019	3	13	4	43	4	NaN	-0.004
St 34	1	Ten. E 100	36	2	POS533_C146	450											1	1					446.2	449.7	12.5134	35.7160	167.00	-0.046	0.000	1027.0573	1029.0481	28.31593	-16.33922	2019	3	13	4	43	11	167.39	0.005
St 34	1	Ten. E 100	36	3	POS533_C147	300	1	1		1	1												298.5	300.7	15.0225	36.0736	189.61	-0.041	0.000	1026.8053	1028.1236	28.31560	-16.33908	2019	3	13	4	47	13	NaN	-0.013
St 34	1	Ten. E 100	36	4	POS533_C148	300											1	1					298.6	300.9	15.0271	36.0744	189.80	-0.048	0.000	1026.8050	1028.1237	28.31560	-16.33908	2019	3	13	4	47	15	189.19	-0.006
St 34	1	Ten. E 100	36	5	POS533_C149	170	1	1		1	1												170.7	171.9	18.7511	36.7373	225.04	0.245	0.000	1026.4215	1027.1643	28.31536	-16.33898	2019	3	13	4	50	7	NaN	-0.001
St 34	1	Ten. E 100	36	6	POS533_C150	170											1	1	1	1	1		170.7	172.0	18.7559	36.7381	225.49	0.239	0.000	1026.4209	1027.1639	28.31536	-16.33897	2019	3	13	4	50	9	224.96	0.003
St 34	1	Ten. E 100	36	7	POS533_C151	150	1	1		1	1					1							151.1	152.2	18.8742	36.7574	228.89	0.338	0.000	1026.4045	1027.0619	28.31528	-16.33894	2019	3	13	4	51	18	NaN	0.015
St 34	1	Ten. E 100	36	8	POS533_C152	150											1	1	1	1	1		150.9	152.0	18.8735	36.7574	228.63	0.393	0.000	1026.4047	1027.0612	28.31528	-16.33894	2019	3	13	4	51	21	228.26	0.009
St 34	1	Ten. E 100	36	9	POS533_C153	50	1	1		1	1												52.6	53.0	18.8635	36.7583	229.05	0.327	0.000	1026.4034	1026.6324	28.31510	-16.33883	2019	3	13	4	53	52	NaN	0.015
St 34	1	Ten. E 100	36	10	POS533_C154	50											1	1	1	1	1		52.6	53.0	18.8636	36.7584	228.68	0.290	0.000	1026.4034	1026.6326	28.31510	-16.33883	2019	3	13	4	53	53	230.98	0.017
St 34	1	Ten. E 100	36	11	POS533_C155	10	1	1		1	1					1							9.7	9.8	18.8836	36.7591	229.35	0.311	0.000	1026.3968	1026.4392	28.31496	-16.33870	2019	3	13	4	55	59	NaN	0.017
St 34	1	Ten. E 100	36	12	POS533_C156	10											1	1	1	1	1		9.9	10.0	18.8834	36.7591	229.88	0.297	0.000	1026.3969	1026.4401	28.31496	-16.33870	2019	3	13	4	56	1	228.97	0.015
St 35	1	Ten. Port 100	37	1	POS533_C169	600		1			1	1					1						593.8	598.6	11.3132	35.5641	148.45	-0.043	0.000	1027.1716	1029.8324	28.41292	-16.23206	2019	3	13	7	16	21	149.89	-0.008
St 35	1	Ten. Port 100	37	2	POS533_C170	300		1			1	1					1						298.0	300.2	15.0873	36.0823	189.15	-0.044	0.000	1026.7977	1028.1132	28.41318	-16.23202	2019	3	13	7	21	59	188.87	-0.011
St 35	1	Ten. Port 100	37	3	POS533_C171	150	1	1			1	1											150.0	151.0	18.0299	36.5864	208.43	0.017	0.000	1026.4868	1027.1415	28.41334	-16.23198	2019	3	13	7	25	18	NaN	-0.002
St 35	1	Ten. Port 100	37	4	POS533_C172	150											1	1	1	1	1		149.9	151.0	18.0316	36.5865	207.57	0.006	0.000	1026.4864	1027.1410	28.41334	-16.23198	2019	3	13	7	25	19	208.66	-0.008
St 35	1	Ten. Port 100	37	5	POS533_C173	100	1	1			1	1											100.8	101.5	18.8735	36.7615	228.79	0.359	0.000	1026.4055	1026.8444	28.41338	-16.23200	2019	3	13	7	26	36	NaN	0.013
St 35	1	Ten. Port 100	37	6	POS533_C174	100											1	1	1	1	1		101.1	101.8	18.8749	36.7614	228.78	0.346	0.000	1026.4051	1026.8449	28.41338	-16.23200	2019	3	13	7	26	38	229.05	0.015
St 35	1	Ten. Port 100	37	7	POS533_C175	75	1	1			1	1											75.8	76.4	18.8709	36.7618	228.89	0.337	0.061	1026.4052	1026.7353	28.41338	-16.23202	2019	3	13	7	27	32	NaN	0.014
St 35	1	Ten. Port 100	37	8	POS533_C176	75											1	1	1	1	1		76.0	76.5	18.8710	36.7619	227.98	0.338	0.061	1026.4053	1026.7359	28.41338	-16.23202	2019	3	13	7	27	34	229.65	0.009
St 35	1	Ten. Port 100	37	9	POS533_C177	50	1	1			1	1											51.8	52.2	18.8620	36.7624	229.50	0.370	0.315	1026.4069	1026.6326	28.41332	-16.23206	2019	3	13	7	28	29	NaN	-0.000
St 35	1	Ten. Port 100	37	10	POS533_C178	50											1	1	1	1	1		52.0	52.4	18.8618	36.7625	229.21	0.369	0.313	1026.4070	1026.6335	28.41332	-16.23206	2019	3	13	7	28	30	228.65	0.004
St 35	1	Ten. Port 100	37	11	POS533_C179	10	1	1			1	1											12.0	12.1	18.8710	36.7667	229.19	0.400	2.833	1026.4060	1026.4583	28.41320	-16.23206	2019	3	13	7	30	2	NaN	0.015
St 35	1	Ten. Port 100	37	12	POS533_C180	10											1	1	1	1	1		11.9	12.0	18.8701	36.7666	229.30	0.411	3.037	1026.4062	1026.4579	28.41320	-16.23206	2019	3	13	7	30	3	228.31	0.033
St 36	1	Ten. NE 100	38	1	POS533_C181	180	1	1			1												179.6	180.9	17.0049	36.4018	201.01	-0.023	0.000	1026.5968	1027.3841	28.50695	-16.11920	2019	3	13	9	26	43	NaN	-0.006
St 36	1	Ten. NE 100	38	2	POS533_C182	180											1	1					180.3	181.6	17.0086	36.4024	201.38	-0.040	0.000	1026.5964	1027.3865	28.50698	-16.11920	2019	3	13	9	26	47	200.66	-0.007
St 36	1	Ten. NE 100	38	3	POS533_C183	150	1	1			1												149.9	151.0	18.6307	36.7123	223.14	0.320	0.023	1026.4321	1027.0849	28.50700	-16.11907	2019	3	13	9	27	53	NaN	0.012
St 36	1	Ten. NE 100	38	4	POS533_C184	150											1	1	1	1	1		150.0	151.0	18.6306	36.7127	223.17	0.304	0.021	1026.4325	1027.0855	28.50701	-16.11906	2019	3	13	9	27	54	223.16	0.010
St 36	1	Ten. NE 100	38	5	POS533_C185	120	1				1												120.2	121.0	18.6773	36.7235	224.29	0.319	0.165	1026.4274	1026.9509	28.50704	-16.11894	2019	3	13	9	28	59	NaN	0.013
St 36	1	Ten. NE 100	38	6	POS533_C186	120											1	1	1	1	1		120.3	121.2	18.6748	36.7229	224.58	0.289	0.164	1026.4277	1026.9517	28.50704	-16.11894	2019	3	13	9	29	0	223.98	0.006
St 36	1	Ten. NE 100	38	7	POS533_C187	90	1	1			1												90.9	91.5	18.7809	36.7457	226.62	0.402	0.800	1026.4167	1026.8124	28.50707	-16.11878	2019	3	13	9	30	13	NaN	0.014
St 36	1	Ten. NE 100	38	8	POS533_C188	90											1	1	1	1	1		90.6	91.3	18.7807	36.7458	225.91	0.437	0.813	1026.4168	1026.8114	28.50706	-16.11878	2019	3	13	9	30	15	226.58	0.012
St 36	1	Ten. NE 100	38	9	POS533_C189	50	1				1												52.0	52.4	18.8749	36.7626	229.06	0.231	7.869	1026.4037	1026.6302	28.50710	-16.11858	2019	3	13	9	32	25	NaN	0.003
St 36	1	Ten. NE 100	38	10	POS533_C190	50											1	1	1	1	1	1	52.1	52.4	18.8745	36.7626	229.93	0.257	7.937	1026.4038	1026.6305	28.50710	-16.11857	2019	3	13	9	32	27	228.45	-0.001
St 36	1	Ten. NE 100	38	11	POS533_C191	10	1	1			1												10.9	10.9	18.8667	36.7620	229.53	0.157	26.567	1026.4034	1026.4507	28.50692	-16.11852	2019	3	13	9	34	52	NaN	0.015
St 36	1	Ten. NE 100	38	12	POS533_C192	10											1	1	1	1	1		10.9	11.0	18.8667	36.7620	229.37	0.164	27.118	1026.4034	1026.4509	28.50692	-16.11852	2019	3	13	9	34	53	229.14	0.018
St 37	1	Ten. -G.Can. 3000	39	1	POS533_C217	200	1	1			1						1						200.1	201.5	15.8865	36.2156	193.37	-0.053	0.000	1026.7166	1027.5976	28.31996	-15.97756	2019	3	13	13	2	12	191.85	-0.004
St 37	1	Ten. -G.Can. 3000	39	2	POS533_C218	150	1	1			1	1					1	1					150.9	152.0	16.9807	36.3946	203.25	-0.028	0.000	1026.5959	1027.2574	28.31994	-15.97749	2019	3	13	13	3	35	204.23	-0.011
St 37	1	Ten. -G.Can. 3000	39	3	POS533_C219	120	1	1			1	1											120.0	120.9	18.2455	36.6304	211.76	0.039	0.000	1026.4653	1026.9890	28.31996	-15.97748	2019	3	13	13	4	33	NaN	-0.002
St 37	1	Ten. -G.Can. 3000	39	4	POS533_C220	120											1	1	1	1	1		120.1	121.0	18.2435	36.6299	213.07	0.040	0.000	1026.4655	1026.9896	28.31994	-15.97748	2019	3	13	13	4	35	211.31	0.000
St 37	1	Ten. -G.Can. 3000	39	5	POS533_C221	80	1	1			1	1											81.2	81.7	18.8790	36.7760	226.12	0.212	0.000	1026.4143	1026.7676	28.31996	-15.97746	2019	3	13	13	5	52	NaN	0.005
St 37	1	Ten. -G.Can. 3000	39	6	POS533_C222	80											1	1	1	1	1		80.6	81.1	18.8765	36.7758	226.39	0.261	0.000	1026.4147	1026.7654	28.31996	-15.97744	2019	3	13	13	6	0	225.99	0.003
St 37	1	Ten. -G.Can. 3000	39	7	POS533_C223	65	1	1			1	1											64.0	64.4	18.8890	36.7778	227.57	0.368	0.000	1026.4123	1026.6908	28.31998	-15.97742	2019	3	13	13	7	23	NaN	-0.022
St 37	1	Ten. -G.Can. 3000	39	8	POS533_C224	65											1	1	1	1	1	1	64.0	64.4	18.8891	36.7779	226.76	0.354	0.000	1026.4124	1026.6907	28.31997	-15.97742	2019	3	13	13	7	26	227.88	-0.009
St 37	1	Ten. -G.Can. 3000	39	9	POS533_C225	40	1	1			1	1											40.4	40.7	18.9276	36.7775	228.78	0.224	0.000	1026.4010	1026.5769	28.31994	-15.97736	2019	3	13	13	8	42	NaN	0.009
St 37	1	Ten. -G.Can. 3000	39	10	POS533_C226	40											1	1	1	1	1		39.7	39.9	18.9285	36.7776	228.81	0.200	0.000	1026.4008	1026.5735	28.31994	-15.97736	2019	3	13	13	8	49	228.22	0.003
St 37	1	Ten. -G.Can. 3000	39	11	POS533_C227	10	1	1			1	1											10.2	10.3	18.9859	36.7787	229.45	0.035	0.000	1026.3856	1026.4299	28.31994	-15.97731	2019	3	13	13	10	0	NaN	0.003
St 37	1	Ten. -G.Can. 3000	39	12	POS533_C228	10											1	1	1	1	1		10.4	10.5	18.9884	36.7790	229.38	0.041	0.000	1026.3851	1026.4306	28.31994	-15.97731	2019	3	13	13	10	2	228.85	0.007
St 37	2	Ten. -G.Can. 3000	40	1	POS533_C229	2900	x	x	x	x	x						x	x					2900.7	2940.5	2.8979	34.9526	232.68	-0.041	0.000	1027.8785	1041.2071	28.31996	-15.97754	2019	3	13	14	37	8	232.90	-0.009

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
No.	Cast	Station Name					300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
St 37	2	Ten. -G.Can. 3000	40	2	POS533_C230	2300			x	x	x						x	x					2301.9	2330.2	3.7046	35.0413	226.77	-0.041	0.000	1027.8693	1038.4504	28.31988	-15.97712	2019	3	13	14	48	5	228.36	-0.018
St 37	2	Ten. -G.Can. 3000	40	3	POS533_C231	1800			x	x	x						x	x					1799.2	1819.2	5.0318	35.2076	218.02	-0.039	0.000	1027.8554	1036.0979	28.31990	-15.97687	2019	3	13	14	57	9	219.39	-0.013
St 37	2	Ten. -G.Can. 3000	40	4	POS533_C232	1200	x	x	x	x	x						x	x					1193.6	1205.1	7.9714	35.4937	174.82	-0.045	0.000	1027.6857	1033.0953	28.31928	-15.97628	2019	3	13	15	8	23	174.11	-0.020
St 37	2	Ten. -G.Can. 3000	40	5	POS533_C233	1000			x	x	x						x	x					999.8	1009.0	8.3662	35.3870	154.28	-0.042	0.000	1027.5389	1032.0694	28.31878	-15.97608	2019	3	13	15	12	19	154.24	-0.020
St 37	2	Ten. -G.Can. 3000	40	6	POS533_C234	850	x	x	x	x	x						x	x					849.3	856.8	9.0978	35.3999	144.71	-0.047	0.000	1027.4315	1031.2706	28.31889	-15.97590	2019	3	13	15	15	39	144.58	-0.018
St 37	2	Ten. -G.Can. 3000	40	7	POS533_C235	550			x	x	x						x	x					550.0	554.5	11.7594	35.6212	162.24	-0.046	0.000	1027.1318	1029.5922	28.31882	-15.97580	2019	3	13	15	21	44	161.08	-0.012
St 37	2	Ten. -G.Can. 3000	40	8	POS533_C236	350	x	x	x	x	x						x	x					348.2	350.9	13.8645	35.8874	187.53	-0.056	0.000	1026.9126	1028.4578	28.31884	-15.97580	2019	3	13	15	26	20	186.87	-0.021
St 37	2	Ten. -G.Can. 3000	40	9	POS533_C237	250		x	x	x	x		x				x	x					249.2	251.0	15.4304	36.1368	192.16	-0.041	0.000	1026.7614	1027.8602	28.31884	-15.97578	2019	3	13	15	28	35	192.35	-0.016
St 37	2	Ten. -G.Can. 3000	40	10	POS533_C238	150	x		x	x	x		x										151.0	152.0	17.3989	36.4683	205.83	-0.015	0.000	1026.5515	1027.2122	28.31884	-15.97579	2019	3	13	15	30	39	NaN	-0.016
St 37	2	Ten. -G.Can. 3000	40	11	POS533_C239	60	x		x	x	x		x										62.6	63.0	18.8757	36.7747	228.60	0.569	0.000	1026.4132	1026.6856	28.31886	-15.97580	2019	3	13	15	32	34	NaN	0.002
St 37	2	Ten. -G.Can. 3000	40	12	POS533_C240	10	x		x	x	x		x				x	x					11.8	11.8	19.0409	36.7750	231.35	0.030	0.000	1026.3686	1026.4198	28.31894	-15.97576	2019	3	13	15	34	21	NaN	0.002
St 38	1	Canaria NW 100	41	1	POS533_C229	2900	1	1	1	1	1						1	1					85.9	86.5	18.6238	36.7162	224.51	0.512	0.000	1026.4339	1026.8082	27.97576	-15.88194	2019	3	13	20	47	42	NaN	0.024
St 38	1	Canaria NW 100	41	2	POS533_C230	2300			1	1	1						1	1					86.3	86.9	18.6328	36.7184	224.18	0.425	0.000	1026.4333	1026.8093	27.97561	-15.88184	2019	3	13	20	49	39	224.69	0.023
St 38	1	Canaria NW 100	41	3	POS533_C231	1800			1	1	1						1	1					69.9	70.3	18.6341	36.7193	224.41	0.432	0.000	1026.4330	1026.7374	27.97554	-15.88174	2019	3	13	20	50	51	NaN	0.017
St 38	1	Canaria NW 100	41	4	POS533_C232	1200	1	1	1	1	1						1	1					69.7	70.2	18.6344	36.7193	224.47	0.492	0.000	1026.4329	1026.7368	27.97554	-15.88174	2019	3	13	20	50	53	224.16	0.013
St 38	1	Canaria NW 100	41	5	POS533_C233	1000			1	1	1						1	1					50.1	50.5	18.6389	36.7214	223.88	0.513	0.000	1026.4324	1026.6508	27.97566	-15.88167	2019	3	13	20	52	2	NaN	0.020
St 38	1	Canaria NW 100	41	6	POS533_C234	850	1	1	1	1	1						1	1					49.9	50.2	18.6390	36.7213	224.40	0.477	0.000	1026.4323	1026.6497	27.97566	-15.88166	2019	3	13	20	52	4	224.76	-0.004
St 38	1	Canaria NW 100	41	7	POS533_C235	550			1	1	1						1	1					37.4	37.6	18.6593	36.7266	225.46	0.685	0.000	1026.4306	1026.5936	27.97572	-15.88160	2019	3	13	20	53	7	NaN	0.015
St 38	1	Canaria NW 100	41	8	POS533_C236	350	1	1	1	1	1						1	1					37.2	37.4	18.6609	36.7267	225.56	0.666	0.000	1026.4303	1026.5923	27.97574	-15.88160	2019	3	13	20	53	10	225.06	0.017
St 38	1	Canaria NW 100	41	9	POS533_C237	250		1	1	1	1		1				1	1					25.7	25.9	18.8601	36.7416	230.29	0.663	0.000	1026.3903	1026.5022	27.97576	-15.88152	2019	3	13	20	54	25	NaN	0.029
St 38	1	Canaria NW 100	41	10	POS533_C238	150	1		1	1	1		1										25.8	26.0	18.8614	36.7416	230.57	0.653	0.000	1026.3899	1026.5023	27.97576	-15.88151	2019	3	13	20	54	28	228.51	0.034
St 38	1	Canaria NW 100	41	11	POS533_C239	60	1		1	1	1		1										10.6	10.7	19.0145	36.7580	230.32	0.375	0.000	1026.3623	1026.4086	27.97570	-15.88146	2019	3	13	20	55	15	NaN	0.027
St 38	1	Canaria NW 100	41	12	POS533_C240	10	1		1	1	1		1				1	1					10.7	10.8	19.0054	36.7567	230.12	0.405	0.000	1026.3637	1026.4103	27.97570	-15.88146	2019	3	13	20	55	17	229.58	0.047
St 39	1	Canaria W 100	42	1	POS533_C241	86	1				1												76.8	77.3	18.6165	36.7175	224.12	0.310	0.000	1026.4364	1026.7710	27.81048	-15.83208	2019	3	14	0	2	57	NaN	0.028
St 39	1	Canaria W 100	42	2	POS533_C242	86											1	1					76.6	77.2	18.6074	36.7149	223.28	0.310	0.000	1026.4367	1026.7706	27.81048	-15.83210	2019	3	14	0	3	4	223.14	0.029
St 39	1	Canaria W 100	42	3	POS533_C243	70	1				1												55.2	55.6	18.7359	36.7426	226.41	0.509	0.000	1026.4242	1026.6648	27.81044	-15.83224	2019	3	14	0	4	13	NaN	0.014
St 39	1	Canaria W 100	42	4	POS533_C244	70											1	1	1	1	1		55.5	55.8	18.7355	36.7426	226.36	0.517	0.000	1026.4243	1026.6658	27.81044	-15.83226	2019	3	14	0	4	16	225.70	0.013
St 39	1	Canaria W 100	42	5	POS533_C245	50	1	1			1												45.3	45.7	18.7683	36.7431	229.52	0.949	0.000	1026.4158	1026.6133	27.81040	-15.83237	2019	3	14	0	5	10	NaN	0.036
St 39	1	Canaria W 100	42	6	POS533_C246	50											1	1	1	1	1		45.4	45.7	18.7682	36.7430	229.30	0.903	0.000	1026.4158	1026.6137	27.81040	-15.83239	2019	3	14	0	5	20	229.09	0.020
St 39	1	Canaria W 100	42	7	POS533_C247	35	1	1			1				1								35.6	35.9	18.7773	36.7430	231.30	0.941	0.000	1026.4130	1026.5682	27.81038	-15.83244	2019	3	14	0	5	52	NaN	0.029
St 39	1	Canaria W 100	42	8	POS533_C248	35											1	1	1	1	1	1	35.4	35.7	18.7775	36.7431	231.12	0.860	0.000	1026.4130	1026.5673	27.81038	-15.83246	2019	3	14	0	5	55	230.00	0.030
St 39	1	Canaria W 100	42	9	POS533_C249	25	1	1			1												25.7	25.8	18.8160	36.7431	232.85	0.755	0.000	1026.4027	1026.5145	27.81040	-15.83250	2019	3	14	0	6	35	NaN	0.040
St 39	1	Canaria W 100	42	10	POS533_C250	25											1	1	1	1	1		25.9	26.1	18.8144	36.7433	233.01	0.687	0.000	1026.4032	1026.5160	27.81040	-15.83249	2019	3	14	0	6	37	231.06	0.013
St 39	1	Canaria W 100	42	11	POS533_C251	10	1	1			1												10.9	11.0	18.9646	36.7436	233.92	0.439	0.000	1026.3642	1026.4118	27.81040	-15.83256	2019	3	14	0	7	24	NaN	0.013
St 39	1	Canaria W 100	42	12	POS533_C252	10											1	1	1	1	1		10.8	10.9	18.9656	36.7435	233.83	0.446	0.000	1026.3639	1026.4110	27.81040	-15.83256	2019	3	14	0	7	25	232.60	0.015
St 40	1	Canaria S 100	43	1	POS533_C265	115	1	1			1												116.4	117.2	18.6898	36.7246	224.16	0.209	0.000	1026.4249	1026.9316	27.68746	-15.70408	2019	3	14	3	12	55	NaN	0.058
St 40	1	Canaria S 100	43	2	POS533_C266	115											1	1					116.2	117.0	18.6896	36.7244	223.54	0.255	0.000	1026.4248	1026.9310	27.68746	-15.70408	2019	3	14	3	13	0	223.84	0.051
St 40	1	Canaria S 100	43	3	POS533_C267	100	1	1			1												101.7	102.4	18.7077	36.7268	224.28	0.259	0.000	1026.4214	1026.8641	27.68746	-15.70402	2019	3	14	3	13	51	NaN	0.054
St 40	1	Canaria S 100	43	4	POS533_C268	100											1	1					101.7	102.4	18.7076	36.7268	224.30	0.279	0.000	1026.4214	1026.8643	27.68746	-15.70402	2019	3	14	3	13	52	223.91	0.061
St 40	1	Canaria S 100	43	5	POS533_C269	70	1	1			1				1	1							72.3	72.8	18.7466	36.7320	225.96	0.339	0.000	1026.4141	1026.7292	27.68746	-15.70392	2019	3	14	3	15	17	NaN	0.054
St 40	1	Canaria S 100	43	6	POS533_C270	70											1	1	1	1	1		71.8	72.3	18.7455	36.7318	225.48	0.327	0.000	1026.4142	1026.7270	27.68745	-15.70392	2019	3	14	3	15	21	225.03	0.055
St 40	1	Canaria S 100	43	7	POS533_C271	50	1	1			1												52.4	52.8	18.7650	36.7336	226.47	0.306	0.000	1026.4097	1026.6380	27.68746	-15.70390	2019	3	14	3	16	24	NaN	0.037
St 40	1	Canaria S 100	43	8	POS533_C272	50											1	1	1	1	1		52.4	52.7	18.7652	36.7337	226.32	0.296	0.000	1026.4097	1026.6379	27.68747	-15.70390	2019	3	14	3	16	25	225.94	0.064
St 40	1	Canaria S 100	43	9	POS533_C273	30	1	1			1				1	1							32.5	32.7	18.7744	36.7362	227.14	0.320	0.000	1026.4084	1026.5500	27.68746	-15.70388	2019	3	14	3	17	21	NaN	0.054
St 40	1	Canaria S 100	43	10	POS533_C274	30											1	1	1	1	1		32.5	32.7	18.7749	36.7363	227.37	0.325	0.000	1026.4083	1026.5499	27.68746	-15.70388	2019	3	14	3	17	23	226.49	0.045
St 40	1	Canaria S 100	43	11	POS533_C275	10	1	1			1				1	1							12.7	12.8	19.0109	36.7582	229.64	0.302	0.000	1026.3635	1026.4186	27.68748	-15.70386	2019	3	14	3	18	20	NaN	0.031
St 40	1	Canaria S 100	43	12	POS533_C276	10											1	1	1	1	1		12.7	12.8	19.0110	36.7581	229.91	0.265	0.000	1026.3634	1026.4187	27.68748	-15.70386	2019	3	14	3	18	22	227.56	0.030
St 41	1	Canaria SE 100	44	1	POS533_C049	70	1	1			1	1	1										71.9	72.4	18.2971	36.6585	221.52	0.224	0.457	1026.4717	1026.7855	27.76088	-15.38107	2019	3	14	8	7	46	NaN	0.035
St 41	1	Canaria SE 100	44	2	POS533_C050	70											1	1	1	1	1		71.7	72.2	18.3033	36.6600	221.38	0.218	0.463	1026.4714	1026.7841	27.76088	-15.38106	2019	3	14	8	7	48	221.69	0.029
St 41	1	Canaria SE 100	44	3	POS533_C051	55	1	1			1	1	1										57.2	57.6	18.4780	36.6928	226.05	0.368	1.192	1026.4518	1026.7011	27.76094	-15.38106	2019	3	14	8	9	15	NaN	0.049
St 41	1	Canaria SE 100	44	4	POS533_C052	55											1	1	1	1	1		57.6	58.0	18.4955	36.6964	225.94	0.338	1.159	1026.4501	1026.7012	27.76094	-15.38106	2019	3	14	8	9	17	225.77	0.050
St 41	1	Canaria SE 100	44	5	POS533_C053	40	1	1			1	1	1										42.6	42.8	18.6401	36.7233	229.22	0.374	2.781	1026.4333	1026.6188	27.76100	-15.38102	2019	3	14	8	10	29	NaN	0.049
St 41	1	Canaria SE 100	44	6	POS533_C054	40											1	1	1	1	1		42.3	42.6	18.6401	36.7232	229.34	0.402	2.799	1026.4332	1026.6174	27.76100	-15.38102	2019	3	14	8	10	31	228.41	0.043
St 41	1	Canaria SE 100	44	7	POS533_C055	30	1	1			1	1	1										30.2	30.5	18.6373	36.7226	228.74	0.356	5.185	1026.4328	1026.5647	27.76106	-15.38102	2019	3	14	8	11	32	NaN	0.021
St 41	1	Canaria SE 100	44	8	POS533_C056	30											1	1	1	1	1		30.2	30.4	18.6377	36.7228	229.27	0.353	5.139	1026.4329	1026.5647	27.76106	-15.38102	2019	3	14	8	11	33	229.03	0.014
St 41	1	Canaria SE 100	44	9	POS533_C057	20	1	1			1	1	1										20.6	20.7	18.6352	36.7222	228.77	0.388	10.821	1026.4327	1026.5222	27.76109	-15.38102	2019	3	14	8	12	27	NaN	0.042
St 41	1	Canaria SE 100	44	10	POS533_C058	20											1	1					20.5	20.6	18.6352	36.7222	229.14	0.423	10.082	1026.4327	1026.5220	27.76110	-15.38100	2019	3	14	8	12	29	228.60	0.052
St 41	1	Canaria SE 100	44	11	POS533_C059	10	1	1			1	1	1										10.9	10.9	18.6332	36.7222	229.25	0.374	14.040	1026.4327	1026.4801	27.76110	-15.38100	2019	3	14	8	13	21	NaN	0.045
St 41	1	Canaria SE 100	44	12	POS533_C060	10											1	1	1	1	1		10.8	10.8	18.6335	36.7221	228.97	0.368	13.936	1026.4326	1026.4795	27.76110	-15.38100	2019	3	14	8	13	23	229.14	0.042
St 42	1	Canaria E 100	45	1	POS533_C133	395		1			1				1	1	1	1					391.7	394.7	12.1551	35.6799	172.36	-0.043	0.000	1027.0976	1028.8487	27.96020	-15.33033	2019	3	14	11	21	30	172.63	-0.013
St 42	1	Canaria E 100	45	2	POS533_C134	230	1	1			1				1	1	1	1					229.7	231.4	14.9881	36.0716	189.86	-0.035	0.000	1026.8091	1027.8241	27.95978	-15.33014	2019	3	14	11	24	42	190.45	-0.016
St 42	1	Canaria E 100	45	3	POS533_C135	100	1	1			1												101.4	102.1	18.1353	36.6207	217.31	0.042	0.927	1026.4847	1026.9274	27.95971	-15.32994	2019	3	14	11	27	29	NaN	-0.004
St 42	1	Canaria E 100	45	4	POS533_C136	100											1	1	1	1	1		101.9	102.6	18.1426	36.6212	217.31	0.043	0.910	1026.4833	1026.9279	27.95970	-15.32994	2019	3	14	11	27	31	215.89	0.009
St 42	1	Canaria E 100	45	5	POS533_C137	75	1	1			1												75.1	75.6	18.4217	36.6830	222.74	0.093	3.221	1026.4592	1026.7868	27.95966	-15.32978	2019	3	14	11	29	8	NaN	-0.002
St 42	1	Canaria E 100	45	6	POS533_C138	75											1	1	1	1	1		75.2	75.7	18.4206	36.6826	223.47	0.101	3.231	1026.4593	1026.7872	27.95966	-15.32978	2019	3	14	11	29	10	223.63	-0.009
St 42	1	Canaria E 100	45	7	POS533_C139	55	1	1			1				1	1							55.6	55.9	18.5654	36.7093	228.62	0.653	10.395	1026.4421	1026.6843	27.95964	-15.32963	2019	3	14	11	30	24	NaN	0.025
St 42	1	Canaria E 100	45	8	POS533_C140	55											1	1	1	1	1	1	55.5	55.8	18.5655	36.7094	228.66	0.656	10.381	1026.4422	1026.6839	27.95964	-15.32962	2019	3	14	11	30	26	228.32	0.016

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 42	1	Canaria E 100	45	9	POS533_C141	25	1	1			1												25.8	26.0	18.6955	36.7217	231.63	0.215	42.525	1026.4171	1026.5295	27.95964	-15.32946	2019	3	14	11	31	52	NaN	0.058
St 42	1	Canaria E 100	45	10	POS533_C142	25											1	1	1	1	1		26.2	26.3	18.6953	36.7217	231.41	0.197	43.728	1026.4172	1026.5312	27.95964	-15.32946	2019	3	14	11	31	53	231.07	0.041
St 42	1	Canaria E 100	45	11	POS533_C143	10	1	1			1				1	1							11.0	11.1	18.7178	36.7226	230.99	0.121	44.159	1026.4115	1026.4594	27.95962	-15.32936	2019	3	14	11	32	45	NaN	0.026
St 42	1	Canaria E 100	45	12	POS533_C144	10											1	1	1	1	1		11.2	11.3	18.7184	36.7226	231.17	0.113	44.671	1026.4113	1026.4601	27.95962	-15.32936	2019	3	14	11	32	54	231.88	0.038
St 43	1	Canaria NE 100	46	1	POS533_C301	300											1	1					299.2	301.4	13.5355	35.8572	180.97	-0.042	0.000	1026.9564	1028.2864	28.11777	-15.38120	2019	3	15	10	13	28	184.74	0.004
St 43	1	Canaria NE 100	46	2	POS533_C302	300	1	1			1	1	1	1	1								299.4	301.6	13.4868	35.8505	181.09	-0.045	0.000	1026.9612	1028.2925	28.11777	-15.38120	2019	3	15	10	13	33	NaN	0.006
St 43	1	Canaria NE 100	46	3	POS533_C303	120											1	1	1	1	1		121.9	122.7	17.6069	36.5163	208.19	-0.026	0.181	1026.5364	1027.0694	28.11752	-15.38108	2019	3	15	10	18	11	208.72	-0.011
St 43	1	Canaria NE 100	46	4	POS533_C304	120	1	1			1	1	1										121.7	122.6	17.6061	36.5161	208.01	-0.019	0.180	1026.5364	1027.0687	28.11754	-15.38108	2019	3	15	10	18	14	NaN	0.020
St 43	1	Canaria NE 100	46	5	POS533_C305	70											1	1	1	1	1		70.3	70.8	18.3630	36.6676	220.25	0.157	2.320	1026.4621	1026.7686	28.11752	-15.38102	2019	3	15	10	19	45	225.76	0.033
St 43	1	Canaria NE 100	46	6	POS533_C306	70	1	1			1	1	1										69.9	70.4	18.3636	36.6678	221.01	0.157	2.332	1026.4620	1026.7671	28.11752	-15.38102	2019	3	15	10	19	47	NaN	0.035
St 43	1	Canaria NE 100	46	7	POS533_C307	50											1	1	1	1	1	1	50.7	51.0	18.6013	36.7053	226.65	0.481	8.832	1026.4297	1026.6505	28.11752	-15.38100	2019	3	15	10	21	4	229.23	0.045
St 43	1	Canaria NE 100	46	8	POS533_C308	50	1	1			1	1	1	1	1								50.1	50.4	18.6000	36.7051	226.79	0.520	8.988	1026.4299	1026.6482	28.11752	-15.38100	2019	3	15	10	21	6	NaN	0.060
St 43	1	Canaria NE 100	46	9	POS533_C309	30											1	1	1	1	1		30.7	30.9	18.7499	36.7235	230.25	0.307	37.743	1026.4049	1026.5385	28.11760	-15.38092	2019	3	15	10	22	6	234.76	0.020
St 43	1	Canaria NE 100	46	10	POS533_C310	30	1	1			1	1	1										31.0	31.2	18.7523	36.7236	230.04	0.300	37.519	1026.4043	1026.5392	28.11762	-15.38090	2019	3	15	10	22	9	NaN	0.022
St 43	1	Canaria NE 100	46	11	POS533_C311	10											1	1	1	1	1		11.0	11.1	18.7871	36.7252	230.94	0.183	29.020	1026.3957	1026.4438	28.11766	-15.38086	2019	3	15	10	22	50	236.94	0.030
St 43	1	Canaria NE 100	46	12	POS533_C312	10	1	1			1	1	1	1	1								11.1	11.2	18.7858	36.7250	231.32	0.171	28.355	1026.3959	1026.4444	28.11766	-15.38086	2019	3	15	10	22	53	NaN	0.021
St 44	1	ESTOC 3500	47	1	POS533_C313	200		1			1						1	1					201.9	203.4	15.8256	36.1973	185.39	-0.043	0.000	1026.7166	1027.6059	29.16672	-15.50035	2019	3	15	19	25	35	187.79	-0.009
St 44	1	ESTOC 3500	47	2	POS533_C314	150	1	1	1	1	1						1	1					150.6	151.7	16.8888	36.3746	186.52	-0.047	0.000	1026.6025	1027.2632	29.16666	-15.50020	2019	3	15	19	27	26	189.61	-0.006
St 44	1	ESTOC 3500	47	3	POS533_C315	120											1	1	1	1	1		122.2	123.1	17.6132	36.4860	190.71	-0.029	0.000	1026.5116	1027.0462	29.16667	-15.50016	2019	3	15	19	28	57	190.43	-0.010
St 44	1	ESTOC 3500	47	4	POS533_C316	120	1				1												121.0	121.8	17.6424	36.4927	191.38	-0.036	0.000	1026.5095	1027.0385	29.16666	-15.50014	2019	3	15	19	29	3	NaN	-0.011
St 44	1	ESTOC 3500	47	5	POS533_C317	95											1	1	1	1	1		95.0	95.6	18.8310	36.7591	224.08	0.153	0.000	1026.4143	1026.8277	29.16656	-15.50004	2019	3	15	19	31	5	225.32	-0.009
St 44	1	ESTOC 3500	47	6	POS533_C318	95	1				1												95.4	96.0	18.8311	36.7589	225.10	0.152	0.000	1026.4141	1026.8293	29.16656	-15.50004	2019	3	15	19	31	10	NaN	-0.001
St 44	1	ESTOC 3500	47	7	POS533_C319	75											1	1	1	1	1	1	72.0	72.5	18.8976	36.7754	228.39	0.301	0.000	1026.4086	1026.7220	29.16654	-15.49998	2019	3	15	19	32	18	228.11	-0.025
St 44	1	ESTOC 3500	47	8	POS533_C320	75	1	1	1	1	1				1								72.4	72.9	18.8987	36.7755	228.59	0.307	0.000	1026.4084	1026.7234	29.16654	-15.49998	2019	3	15	19	32	23	NaN	-0.002
St 44	1	ESTOC 3500	47	9	POS533_C321	30											1	1	1	1	1		30.0	30.2	18.9606	36.7834	230.59	0.318	0.000	1026.3966	1026.5271	29.16646	-15.49988	2019	3	15	19	34	19	230.97	0.022
St 44	1	ESTOC 3500	47	10	POS533_C322	30	1				1												31.1	31.3	18.9607	36.7834	230.34	0.271	0.000	1026.3966	1026.5319	29.16644	-15.49986	2019	3	15	19	34	23	NaN	0.028
St 44	1	ESTOC 3500	47	11	POS533_C323	10											1	1	1	1	1		10.4	10.4	19.1771	36.7884	230.74	0.301	0.000	1026.3435	1026.3886	29.16640	-15.49982	2019	3	15	19	35	32	230.52	0.029
St 44	1	ESTOC 3500	47	12	POS533_C324	10	1	1	1	1	1												11.6	11.7	19.1835	36.7883	230.62	0.289	0.000	1026.3418	1026.3925	29.16644	-15.49984	2019	3	15	19	35	38	NaN	0.025
St 44	2	ESTOC 3500	48	1	POS533_C325	3500	1	1	1	1	1						1	1					3498.6	3551.9	2.5278	34.9129	236.03	-0.041	0.000	1027.8833	1043.9135	29.16606	-15.49833	2019	3	15	21	17	9	235.64	-0.016
St 44	2	ESTOC 3500	48	2	POS533_C326	3000		1	1	1	1						1	1					3006.4	3048.7	2.8642	34.9499	234.33	-0.050	0.000	1027.8803	1041.6861	29.16613	-15.49818	2019	3	15	21	29	14	234.51	-0.019
St 44	2	ESTOC 3500	48	3	POS533_C327	2500			1	1	1						1	1					2503.4	2535.6	3.4352	35.0130	230.66	-0.041	0.000	1027.8745	1039.3810	29.16540	-15.49784	2019	3	15	21	38	54	233.50	-0.015
St 44	2	ESTOC 3500	48	4	POS533_C328	2000	1		1	1	1						1	1					1997.0	2020.3	4.5115	35.1434	223.89	-0.050	0.000	1027.8645	1037.0257	29.16518	-15.49765	2019	3	15	21	49	12	226.59	-0.012
St 44	2	ESTOC 3500	48	5	POS533_C329	1500			1	1	1						1	1					1496.0	1511.6	6.3778	35.3474	197.74	-0.047	0.000	1027.7975	1034.6180	29.16480	-15.49756	2019	3	15	21	58	6	198.39	-0.010
St 44	2	ESTOC 3500	48	6	POS533_C330	1200	1	1	1	1	1						1	1					1203.9	1215.6	7.5110	35.4113	175.21	-0.041	0.000	1027.6883	1033.1578	29.16472	-15.49766	2019	3	15	22	3	36	174.42	-0.015
St 44	2	ESTOC 3500	48	7	POS533_C331	1100			1	1	1						1	1					1100.0	1110.4	7.6572	35.3636	164.33	-0.040	0.000	1027.6279	1032.6264	29.16466	-15.49768	2019	3	15	22	6	12	163.34	-0.015
St 44	2	ESTOC 3500	48	8	POS533_C332	1000			1	1	1						1	1					1000.9	1010.1	7.9389	35.3302	153.91	-0.045	0.000	1027.5587	1032.1042	29.16458	-15.49768	2019	3	15	22	8	36	152.67	-0.019
St 44	2	ESTOC 3500	48	9	POS533_C333	750	1	1	1	1	1				1		1	1					749.4	755.9	9.2432	35.3460	132.59	-0.041	0.000	1027.3638	1030.7523	29.16430	-15.49802	2019	3	15	22	17	3	131.41	-0.016
St 44	2	ESTOC 3500	48	10	POS533_C334	600			1	1	1						1	1					602.0	606.9	10.8536	35.5134	144.59	-0.041	0.000	1027.2159	1029.9194	29.16407	-15.49810	2019	3	15	22	20	43	145.72	-0.016
St 44	2	ESTOC 3500	48	11	POS533_C335	450			1	1	1						1	1					450.8	454.4	12.4370	35.7034	178.22	-0.049	0.000	1027.0626	1029.0745	29.16372	-15.49816	2019	3	15	22	24	25	178.33	-0.016
St 44	2	ESTOC 3500	48	12	POS533_C336	300	1	1	1	1	1				1		1	1					299.8	302.1	13.8118	35.8815	189.93	-0.050	0.000	1026.9176	1028.2489	29.16364	-15.49827	2019	3	15	22	27	43	189.98	-0.020
St 45	1	Selvagens 100	49	1	POS533_C337	300	1	1			1	1	1		1		1	1					299.7	302.0	14.0665	35.9116	193.30	-0.040	0.000	1026.8872	1028.2166	30.01728	-16.07887	2019	3	16	9	20	27	194.00	-0.014
St 45	1	Selvagens 100	49	2	POS533_C338	195	1	1			1	1	1		1	1	1	1					196.0	197.5	17.3371	36.4799	211.21	0.026	0.000	1026.5774	1027.4352	30.01732	-16.07868	2019	3	16	9	23	6	210.03	-0.013
St 45	1	Selvagens 100	49	3	POS533_C339	120											1	1	1	1	1		120.1	121.0	18.5109	36.7203	225.74	0.140	0.326	1026.4673	1026.9909	30.01736	-16.07856	2019	3	16	9	25	27	226.04	-0.002
St 45	1	Selvagens 100	49	4	POS533_C340	120	1				1	1	1										120.1	121.0	18.5105	36.7206	225.10	0.135	0.330	1026.4676	1026.9910	30.01734	-16.07854	2019	3	16	9	25	39	NaN	-0.007
St 45	1	Selvagens 100	49	5	POS533_C341	100											1	1	1	1	1	1	100.2	100.9	18.5798	36.7372	227.24	0.322	0.839	1026.4618	1026.8985	30.01734	-16.07852	2019	3	16	9	26	55	228.20	0.007
St 45	1	Selvagens 100	49	6	POS533_C342	100	1	1			1	1	1		1	1							100.6	101.3	18.5853	36.7381	227.26	0.337	0.837	1026.4612	1026.8995	30.01734	-16.07853	2019	3	16	9	27	1	NaN	0.015
St 45	1	Selvagens 100	49	7	POS533_C343	80											1	1	1	1	1		81.1	81.7	18.6452	36.7516	228.04	0.324	2.489	1026.4554	1026.8088	30.01732	-16.07844	2019	3	16	9	28	18	230.04	0.009
St 45	1	Selvagens 100	49	8	POS533_C344	80	1				1	1	1										80.8	81.3	18.6469	36.7519	228.58	0.321	2.552	1026.4551	1026.8071	30.01734	-16.07844	2019	3	16	9	28	24	NaN	0.007
St 45	1	Selvagens 100	49	9	POS533_C345	60											1	1	1	1	1		60.2	60.7	18.6748	36.7575	229.05	0.194	8.301	1026.4514	1026.7139	30.01734	-16.07841	2019	3	16	9	29	39	229.79	-0.009
St 45	1	Selvagens 100	49	10	POS533_C346	60	1	1			1	1	1			1							61.6	62.0	18.6751	36.7576	229.22	0.179	7.712	1026.4515	1026.7199	30.01736	-16.07842	2019	3	16	9	29	44	NaN	-0.015
St 45	1	Selvagens 100	49	11	POS533_C347	10											1	1	1	1	1		10.1	10.2	18.7542	36.7657	229.81	0.022	35.855	1026.4351	1026.4793	30.01722	-16.07840	2019	3	16	9	31	49	231.56	0.007
St 45	1	Selvagens 100	49	12	POS533_C348	10	1	1			1	1	1		1								10.0	10.1	18.7549	36.7658	230.21	0.024	35.051	1026.4350	1026.4787	30.01724	-16.07840	2019	3	16	9	31	53	NaN	0.002
St 46	1	Trans. M1 3000	50	1	POS533_C349	300		1			1						1	1					298.6	300.9	13.7853	35.8249	204.26	-0.049	0.000	1026.8794	1028.2058	32.72112	-17.62778	2019	3	17	13	10	16	204.51	-0.015
St 46	1	Trans. M1 3000	50	2	POS533_C350	200	1	1	1	1	1						1	1					199.2	200.7	15.5961	36.0998	205.45	-0.034	0.017	1026.6937	1027.5724	32.72116	-17.62778	2019	3	17	13	12	34	206.61	-0.017
St 46	1	Trans. M1 3000	50	3	POS533_C351	120											1	1	1	1	1		120.5	121.3	18.3819	36.6435	226.38	0.183	0.684	1026.4411	1026.9664	32.72110	-17.62766	2019	3	17	13	14	38	226.08	0.003
St 46	1	Trans. M1 3000	50	4	POS533_C352	120	1	1	1	1	1												120.8	121.7	18.3787	36.6427	226.46	0.170	0.673	1026.4413	1026.9680	32.72110	-17.62766	2019	3	17	13	14	39	NaN	0.004
St 46	1	Trans. M1 3000	50	5	POS533_C353	90											1	1	1	1	1		90.9	91.6	18.4374	36.6600	228.43	0.317	2.539	1026.4384	1026.8351	32.72096	-17.62762	2019	3	17	13	15	55	228.98	0.003
St 46	1	Trans. M1 3000	50	6	POS533_C354	90	1				1												90.8	91.5	18.4387	36.6606	228.48	0.327	2.538	1026.4385	1026.8347	32.72096	-17.62762	2019	3	17	13	15	57	NaN	0.003
St 46	1	Trans. M1 3000	50	7	POS533_C355	70											1	1	1	1	1		71.4	71.9	18.4595	36.6674	228.65	0.523	7.211	1026.4376	1026.7488	32.72092	-17.62758	2019	3	17	13	16	57	229.11	0.006
St 46	1	Trans. M1 3000	50	8	POS533_C356	70	1	1	1	1	1												71.6	72.1	18.4596	36.6674	229.36	0.486	7.144	1026.4375	1026.7497	32.72092	-17.62758	2019	3	17	13	16	59	NaN	0.006
St 46	1	Trans. M1 3000	50	9	POS533_C357	50											1	1	1	1	1		49.6	49.9	18.4832	36.6705	231.06	0.298	22.830	1026.4329	1026.6493	32.72096	-17.62756	2019	3	17	13	18	2	230.68	0.003
St 46	1	Trans. M1 3000	50	10	POS533_C358	50	1	1			1												49.7	50.0	18.4834	36.6706	230.89	0.358	23.093	1026.4330	1026.6498	32.72096	-17.62756	2019	3	17	13	18	4	NaN	0.029
St 46	1	Trans. M1 3000	50	11	POS533_C359	10											1	1	1	1	1		9.1	9.2	18.5009	36.6666	230.89	0.041	46.115	1026.4237	1026.4636	32.72104	-17.62754	2019	3	17	13	19	40	231.49	-0.019
St 46	1	Trans. M1 3000	50	12	POS533_C360	10	1	1	1	1	1												9.1	9.2	18.5009	36.6666	231.43	0.064	55.090	1026.4237	1026.4636	32.72103	-17.62754	2019	3	17	13	19	42	NaN	-0.014
St 46	2	Trans. M1 3000	51	1	POS533_C361	2960	1	1	1	1	1						1	1					2962.5	3004.7	2.8131	34.9463	240.24	-0.047	0.000	1027.8813	1041.4982	32.72140	-17.62842	2019	3	17	14	47	41	241.22	-0.023
St 46	2	Trans. M1 3000	51	2	POS533_C362	2500		1	1	1	1						1	1					2500.7	2533.6	3.2731	34.9935	242.42	-0.037	0.000	1027.8740	1039.3824	32.72156	-17.62855	2019	3	17	14	56	34	243.31	-0.025
St 46	2	Trans. M1 3000	51	3	POS533_C363	2220			1	1	1						1	1					2208.1	2235.6	3.7888	35.0494	242.98	-0.053	0.000	1027.8665	1038.0233	32.72136	-17.62826	2019	3	17	15	4	6	244.51	-0.013

Station-lable on cruise			Station numbering of CTD eval.	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-PI	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
No.	Cast	Station Name	(GK)				300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw											µmol/kg	raw
St 46	2	Trans. M1 3000	51	4	POS533_C364	2100		1	1	1	1						1	1					2104.9	2130.6	4.0047	35.0760	241.66	-0.035	0.000	1027.8651	1037.5433	32.72144	-17.62839	2019	3	17	15	6	56	243.62	-0.027
St 46	2	Trans. M1 3000	51	5	POS533_C365	1650			1	1	1						1	1					1650.4	1668.7	5.6409	35.2945	226.90	-0.053	0.000	1027.8506	1035.3975	32.72149	-17.62836	2019	3	17	15	15	56	229.05	-0.018
St 46	2	Trans. M1 3000	51	6	POS533_C366	1550			1	1	1						1	1					1551.7	1568.6	6.1379	35.3636	221.17	-0.041	0.000	1027.8421	1034.9241	32.72160	-17.62826	2019	3	17	15	18	24	221.87	-0.019
St 46	2	Trans. M1 3000	51	7	POS533_C367	1200		1	1	1	1						1	1					1200.4	1212.4	8.4951	35.6870	191.19	-0.047	0.000	1027.7584	1033.1842	32.72142	-17.62800	2019	3	17	15	25	43	191.23	-0.013
St 46	2	Trans. M1 3000	51	8	POS533_C368	1100			1	1	1						1	1					1098.0	1108.8	8.7261	35.6479	179.99	-0.041	0.000	1027.6898	1032.6519	32.72136	-17.62817	2019	3	17	15	28	25	179.91	-0.013
St 46	2	Trans. M1 3000	51	9	POS533_C369	920	1	1	1	1	1						1	1					919.5	928.0	9.2849	35.6065	168.30	-0.042	0.000	1027.5644	1031.7144	32.72146	-17.62814	2019	3	17	15	32	13	167.77	-0.017
St 46	2	Trans. M1 3000	51	10	POS533_C370	650			1	1	1						1	1					653.7	659.4	11.0208	35.5635	180.46	-0.047	0.000	1027.2260	1030.1591	32.72142	-17.62849	2019	3	17	15	37	33	179.92	-0.007
St 46	2	Trans. M1 3000	51	11	POS533_C371	400	1	1	1	1	1						1	1					402.9	406.2	13.0019	35.7267	205.06	-0.047	0.000	1026.9672	1028.7620	32.72131	-17.62823	2019	3	17	15	42	40	203.14	-0.017
St 46	2	Trans. M1 3000	51	12	POS533_C372	300	1	1	1	1	1						1	1					301.0	303.3	14.4557	35.9344	199.64	-0.052	0.000	1026.8217	1028.1547	32.72117	-17.62822	2019	3	17	15	45	5	NaN	-0.013
St 47	1	Trans. M2 600	52	1	POS533_C373	450		1							1		1	1					447.4	451.0	12.7512	35.7216	192.39	-0.041	0.000	1027.0147	1029.0091	32.66030	-17.45706	2019	3	17	18	5	5	194.22	-0.015
St 47	1	Trans. M2 600	52	2	POS533_C374	275	1	1			1	1	1		1		1	1					274.9	277.0	15.0535	36.0390	197.49	-0.037	0.000	1026.7710	1027.9853	32.66017	-17.45708	2019	3	17	18	8	26	198.93	-0.018
St 47	1	Trans. M2 600	52	3	POS533_C375	120											1	1	1		1		121.5	122.4	18.7315	36.7533	225.08	0.189	0.083	1026.4366	1026.9657	32.66026	-17.45712	2019	3	17	18	12	30	227.34	-0.009
St 47	1	Trans. M2 600	52	4	POS533_C376	120	1				1	1	1										121.2	122.1	18.7515	36.7603	225.97	0.205	0.084	1026.4367	1026.9643	32.66027	-17.45712	2019	3	17	18	12	44	NaN	-0.011
St 47	1	Trans. M2 600	52	5	POS533_C377	90											1	1	1		1		90.6	91.3	18.7575	36.7616	227.43	0.401	0.402	1026.4348	1026.8294	32.66020	-17.45706	2019	3	17	18	14	59	227.25	-0.009
St 47	1	Trans. M2 600	52	6	POS533_C378	90	1	1			1	1	1										90.4	91.0	18.7573	36.7614	227.18	0.364	0.404	1026.4347	1026.8283	32.66018	-17.45706	2019	3	17	18	15	5	NaN	-0.011
St 47	1	Trans. M2 600	52	7	POS533_C379	70											1	1	1		1		69.6	70.1	18.7515	36.7591	228.65	0.450	1.247	1026.4335	1026.7368	32.66018	-17.45704	2019	3	17	18	16	53	227.88	-0.003
St 47	1	Trans. M2 600	52	8	POS533_C380	70	1	1	1		1	1	1		1								69.8	70.3	18.7518	36.7591	228.62	0.452	1.231	1026.4334	1026.7376	32.66018	-17.45703	2019	3	17	18	17	6	NaN	-0.003
St 47	1	Trans. M2 600	52	9	POS533_C381	50											1	1	1		1		49.8	50.2	18.7404	36.7426	230.12	0.237	3.511	1026.4228	1026.6398	32.66020	-17.45694	2019	3	17	18	18	52	231.05	-0.009
St 47	1	Trans. M2 600	52	10	POS533_C382	50	1	1			1	1	1										49.7	50.1	18.7416	36.7440	229.69	0.241	3.493	1026.4235	1026.6403	32.66020	-17.45695	2019	3	17	18	18	56	NaN	-0.007
St 47	1	Trans. M2 600	52	11	POS533_C383	10											1	1	1		1		8.2	8.2	18.7162	36.7326	230.49	0.152	52.563	1026.4194	1026.4551	32.66008	-17.45681	2019	3	17	18	20	59	229.99	0.006
St 47	1	Trans. M2 600	52	12	POS533_C384	10	1	1	1		1	1	1		1								8.4	8.4	18.7143	36.7319	230.68	0.167	49.171	1026.4194	1026.4559	32.66003	-17.45680	2019	3	17	18	21	23	NaN	-0.002
St 48	1	Trans. M3 3000	53	1	POS533_C385	450		1			1						1	1					447.0	450.6	13.0240	35.7554	194.42	-0.065	0.000	1026.9863	1028.9764	32.57650	-17.21690	2019	3	17	21	46	41	193.92	-0.019
St 48	1	Trans. M3 3000	53	2	POS533_C386	300					1						1	1					299.1	301.5	14.7129	35.9700	201.53	-0.050	0.000	1026.7934	1028.1168	32.57654	-17.21700	2019	3	17	21	50	34	201.99	-0.012
St 48	1	Trans. M3 3000	53	3	POS533_C387	240		1			1						1	1					239.9	241.8	15.6088	36.0946	209.24	-0.050	0.000	1026.6882	1027.7460	32.57662	-17.21705	2019	3	17	21	52	27	208.86	-0.013
St 48	1	Trans. M3 3000	53	4	POS533_C388	200	1				1						1	1					200.3	201.8	16.4111	36.2427	204.32	-0.033	0.000	1026.6160	1027.4963	32.57667	-17.21712	2019	3	17	21	53	55	204.00	-0.020
St 48	1	Trans. M3 3000	53	5	POS533_C389	120											1	1	1	1	1		121.6	122.5	18.7831	36.7632	228.32	0.241	0.000	1026.4309	1026.9602	32.57670	-17.21718	2019	3	17	21	56	12	227.30	-0.012
St 48	1	Trans. M3 3000	53	6	POS533_C390	120	1	1			1												121.4	122.3	18.7835	36.7636	227.20	0.283	0.000	1026.4311	1026.9597	32.57672	-17.21720	2019	3	17	21	56	32	NaN	-0.007
St 48	1	Trans. M3 3000	53	7	POS533_C391	75											1	1	1	1	1		75.0	75.6	18.7638	36.7519	228.54	0.365	0.000	1026.4251	1026.7519	32.57677	-17.21730	2019	3	17	21	58	18	228.19	0.011
St 48	1	Trans. M3 3000	53	8	POS533_C392	75	1	1			1												74.9	75.4	18.7632	36.7517	228.68	0.375	0.000	1026.4250	1026.7512	32.57676	-17.21732	2019	3	17	21	58	26	NaN	-0.002
St 48	1	Trans. M3 3000	53	9	POS533_C393	50											1	1	1	1	1		50.8	51.2	18.6987	36.7267	230.33	0.249	0.000	1026.4213	1026.6427	32.57680	-17.21734	2019	3	17	22	0	1	229.45	0.001
St 48	1	Trans. M3 3000	53	10	POS533_C394	50	1	1			1												50.7	51.0	18.6987	36.7267	229.87	0.289	0.000	1026.4213	1026.6421	32.57680	-17.21735	2019	3	17	22	0	7	NaN	-0.007
St 48	1	Trans. M3 3000	53	11	POS533_C395	10											1	1	1	1	1		10.3	10.3	18.7033	36.7145	230.52	0.162	0.000	1026.4089	1026.4536	32.57684	-17.21742	2019	3	17	22	1	53	229.51	0.007
St 48	1	Trans. M3 3000	53	12	POS533_C396	10	1	1			1												10.4	10.5	18.7032	36.7145	230.91	0.162	0.000	1026.4089	1026.4545	32.57684	-17.21742	2019	3	17	22	1	58	NaN	0.002
St 49	1	Trans. M4 600	54	1	POS533_C397	450		1			1			1	1		1	1					446.2	449.9	12.7800	35.7261	192.32	-0.048	0.000	1027.0125	1029.0014	32.48444	-16.96958	2019	3	18	1	38	12	193.10	-0.025
St 49	1	Trans. M4 600	54	2	POS533_C398	200					1	1	1	1	1		1	1					200.9	202.4	16.9436	36.3603	202.04	-0.031	0.000	1026.5805	1027.4612	32.48428	-16.96934	2019	3	18	1	43	16	203.44	-0.016
St 49	1	Trans. M4 600	54	3	POS533_C399	120											1	1	1	1	1		122.0	122.9	18.5628	36.7180	227.61	0.401	0.000	1026.4525	1026.9842	32.48436	-16.96932	2019	3	18	1	45	31	227.53	0.012
St 49	1	Trans. M4 600	54	4	POS533_C400	120	1	1			1	1	1										122.1	123.0	18.5616	36.7175	227.75	0.422	0.000	1026.4524	1026.9847	32.48436	-16.96934	2019	3	18	1	45	45	NaN	0.004
St 49	1	Trans. M4 600	54	5	POS533_C401	100											1	1	1	1	1		100.2	101.0	18.5736	36.7215	228.10	0.650	0.000	1026.4514	1026.8882	32.48440	-16.96952	2019	3	18	1	47	17	227.84	0.007
St 49	1	Trans. M4 600	54	6	POS533_C402	100	1	1			1	1	1										99.6	100.4	18.5732	36.7214	227.63	0.736	0.000	1026.4514	1026.8857	32.48442	-16.96954	2019	3	18	1	47	24	NaN	0.015
St 49	1	Trans. M4 600	54	7	POS533_C403	75											1	1	1	1	1	1	76.7	77.3	18.5389	36.7001	229.72	0.441	0.000	1026.4428	1026.7773	32.48460	-16.96966	2019	3	18	1	48	36	229.72	0.003
St 49	1	Trans. M4 600	54	8	POS533_C404	75	1	1			1	1	1										77.0	77.5	18.5398	36.7001	229.81	0.442	0.000	1026.4425	1026.7781	32.48464	-16.96966	2019	3	18	1	48	48	NaN	0.005
St 49	1	Trans. M4 600	54	9	POS533_C405	40													1	1	1		40.9	41.2	18.5423	36.6978	229.97	0.318	0.000	1026.4385	1026.6168	32.48478	-16.96964	2019	3	18	1	50	9	NaN	0.009
St 49	1	Trans. M4 600	54	10	POS533_C406	40	1	1			1	1	1										40.9	41.2	18.5411	36.6978	230.84	0.300	0.000	1026.4388	1026.6171	32.48480	-16.96964	2019	3	18	1	50	20	NaN	0.009
St 49	1	Trans. M4 600	54	11	POS533_C407	10											1	1	1	1	1		10.7	10.8	18.5340	36.6974	230.76	0.306	0.000	1026.4390	1026.4857	32.48482	-16.96968	2019	3	18	1	51	28	230.70	0.012
St 49	1	Trans. M4 600	54	12	POS533_C408	10	1	1			1	1	1										10.8	10.9	18.5353	36.6971	230.91	0.308	0.000	1026.4384	1026.4856	32.48482	-16.96970	2019	3	18	1	51	40	NaN	0.017
St 50	1	Trans. M5 3000	55	1	POS533_C409	400											1	1					397.5	400.7	13.4265	35.8055	195.21	-0.040	0.000	1026.9417	1028.7092	32.38277	-16.69166	2019	3	18	4	42	28	195.89	-0.025
St 50	1	Trans. M5 3000	55	2	POS533_C410	280											1	1					279.3	281.5	15.6949	36.1588	198.82	-0.031	0.000	1026.7196	1027.9502	32.38288	-16.69167	2019	3	18	4	44	42	199.47	-0.022
St 50	1	Trans. M5 3000	55	3	POS533_C411	210								1	1		1	1					210.2	211.8	17.1929	36.4167	203.92	-0.029	0.000	1026.5643	1027.4849	32.38302	-16.69178	2019	3	18	4	46	41	206.59	-0.015
St 50	1	Trans. M5 3000	55	4	POS533_C412	190											1	1					186.6	188.0	18.4899	36.6949	221.53	0.068	0.000	1026.4562	1027.2691	32.38306	-16.69176	2019	3	18	4	48	55	218.48	-0.010
St 50	1	Trans. M5 3000	55	5	POS533_C413	100											1	1	1	1	1		101.6	102.3	18.7190	36.7619	225.70	0.191	0.000	1026.4454	1026.8879	32.38303	-16.69180	2019	3	18	4	50	57	226.53	-0.007
St 50	1	Trans. M5 3000	55	6	POS533_C414	100																	102.2	103.0	18.7191	36.7619	225.99	0.202	0.000	1026.4454	1026.8906	32.38303	-16.69180	2019	3	18	4	51	0	NaN	-0.003
St 50	1	Trans. M5 3000	55	7	POS533_C415	78													1	1	1		80.1	80.7	18.7146	36.7617	225.92	0.212	0.000	1026.4454	1026.7944	32.38298	-16.69176	2019	3	18	4	52	4	NaN	-0.007
St 50	1	Trans. M5 3000	55	8	POS533_C416	78																	80.2	80.7	18.7147	36.7618	226.11	0.200	0.000	1026.4454	1026.7947	32.38298	-16.69176	2019	3	18	4	52	6	NaN	-0.011
St 50	1	Trans. M5 3000	55	9	POS533_C417	40											1	1	1	1	1		39.6	39.9	18.7035	36.7575	227.83	0.310	0.000	1026.4431	1026.6158	32.38298	-16.69167	2019	3	18	4	53	32	228.42	0.005
St 50	1	Trans. M5 3000	55	10	POS533_C418	40																	39.1	39.3	18.7028	36.7575	227.92	0.338	0.000	1026.4432	1026.6135	32.38298	-16.69166	2019	3	18	4	53	33	NaN	0.000
St 50	1	Trans. M5 3000	55	11	POS533_C419	10											1	1	1	1	1		8.5	8.6	18.7016	36.7578	229.09	0.323	0.000	1026.4424	1026.4795	32.38304	-16.69158	2019	3	18	4	55	1	228.53	0.014
St 50	1	Trans. M5 3000	55	12	POS533_C420	10								1	1								8.5	8.6	18.7021	36.7578	228.75	0.301	0.000	1026.4423	1026.4795	32.38304	-16.69158	2019	3	18	4	55	3	NaN	0.006
St 50	2	Trans. M5 3000	56	1	POS533_C421	3200	1	1			1						1	1					3158.7	3205.1	2.6796	34.9317	240.26	-0.041	0.000	1027.8827	1042.3882	32.38290	-16.69158	2019	3	18	6	37	57	241.67	-0.018
St 50	2	Trans. M5 3000	56	2	POS533_C422	2200		1			1						1	1					2197.5	2224.7	3.8549	35.0643	239.04	-0.044	0.000	1027.8718	1037.9762	32.38290	-16.69148	2019	3	18	6	56	53	240.35	-0.014
St 50	2	Trans. M5 3000	56	3	POS533_C423	1500		1			1						1	1					1482.2	1498.0	6.5161	35.4231	213.04	-0.048	0.000	1027.8390	1034.5935	32.38288	-16.69175	2019	3	18	7	9	41	213.13	-0.017
St 50	2	Trans. M5 3000	56	4	POS533_C424	1100		1			1						1	1					1087.9	1098.4	9.0184	35.7094	183.45	-0.051	0.000	1027.6915	1032.6003	32.38310	-16.69183	2019	3	18	7	16	55	184.30	-0.023
St 50	2	Trans. M5 3000	56	5	POS533_C425	790	1	1			1						1	1					782.2	789.2	10.3998	35.6191	170.44	-0.046	0.000	1027.3830	1030.8984	32.38280	-16.69154	2019	3	18	7	23	45	169.48	-0.016
St 50	2	Trans. M5 3000	56	6	POS533_C426	435		1			1						1	1					432.2	435.7	12.7609	35.6959	204.26	-0.042	0.000	1026.9924	1028.9194	32.38256	-16.69116	2019	3	18	7	29	59	203.29	-0.013
St 50	2	Trans. M5 3000	56	7	POS533_C427	380					1						1	1					377.8	380.8	13.6419	35.8372	195.26	-0.051	0.000	1026.9212	1028.5996	32.38260	-16.69108	2019	3	18	7	31	30	196.33	-0.019
St 50	2	Trans. M5 3000	56	8	POS533_C428	200	1				1												200.4	201.9	17.3480	36.4510	205.71	-0.034	0.000	1026.5527	1027.4297	32.38276	-16.69104	2019	3	18	7	34	57	NaN	-0.009
St 50	2	Trans. M5 3000	56	9	POS533_C429	100	1				1												99.8	100.5	18.7082	36.7596	227.81	0.295	0.000	1026.4463	1026.8809	32.38268	-16.69098	2019	3	18	7	37	37	NaN	0.006
St 50	2	Trans. M5 3000	56	10	POS533_C430	78	1	1			1												77.8	78.4	18.7085	36.7601	228.19	0.250	0.000	1026.4456	1026.7848	32.38266	-16.69098	2019	3	18	7	38	47	NaN	0.004

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 50	2	Trans. M5 3000	56	11	POS533_C431	40	1	1			1												40.8	41.1	18.7018	36.7599	228.20	0.241	0.000	1026.4455	1026.6232	32.38260	-16.69098	2019	3	18	7	39	48	NaN	0.012
St 50	2	Trans. M5 3000	56	12	POS533_C432	10	1	1			1												9.1	9.2	18.6901	36.7593	228.93	0.228	0.000	1026.4465	1026.4862	32.38260	-16.69094	2019	3	18	7	41	4	NaN	0.003
St 51	1	Trans. M6 600	57	1	POS533_C433	405		1			1				1		1	1					402.8	406.1	13.0452	35.7403	199.43	-0.053	0.000	1026.9691	1028.7631	32.27168	-16.38835	2019	3	18	10	29	20	198.26	-0.025
St 51	1	Trans. M6 600	57	2	POS533_C434	300		1			1	1	1		1		1	1					299.1	301.5	14.1870	35.9064	197.22	-0.033	0.000	1026.8576	1028.1841	32.27143	-16.38830	2019	3	18	10	31	46	198.60	-0.015
St 51	1	Trans. M6 600	57	3	POS533_C435	180	1				1						1	1					181.4	182.8	16.5960	36.3019	204.13	-0.034	0.009	1026.6173	1027.4140	32.27112	-16.38810	2019	3	18	10	34	37	204.68	-0.022
St 51	1	Trans. M6 600	57	4	POS533_C436	130	1	1			1	1	1				1	1					130.1	131.0	18.0519	36.6081	220.78	0.087	0.185	1026.4971	1027.0650	32.27106	-16.38800	2019	3	18	10	36	20	221.89	0.000
St 51	1	Trans. M6 600	57	5	POS533_C437	100											1	1	1	1	1		100.3	101.0	18.3554	36.6786	227.23	0.266	1.149	1026.4738	1026.9112	32.27104	-16.38800	2019	3	18	10	37	34	228.29	-0.005
St 51	1	Trans. M6 600	57	6	POS533_C438	100	1				1	1	1										99.3	100.1	18.3569	36.6790	227.30	0.248	1.041	1026.4736	1026.9070	32.27102	-16.38798	2019	3	18	10	37	39	NaN	0.032
St 51	1	Trans. M6 600	57	7	POS533_C439	75											1	1	1	1	1	1	75.6	76.2	18.4105	36.6935	228.79	0.248	3.112	1026.4702	1026.8001	32.27094	-16.38786	2019	3	18	10	38	50	230.84	-0.003
St 51	1	Trans. M6 600	57	8	POS533_C440	75	1	1			1	1	1		1								75.5	76.1	18.4107	36.6936	228.69	0.243	2.873	1026.4702	1026.7997	32.27092	-16.38787	2019	3	18	10	38	59	NaN	0.006
St 51	1	Trans. M6 600	57	9	POS533_C441	50											1	1	1	1	1		50.4	50.7	18.4195	36.6967	229.12	0.307	11.761	1026.4692	1026.6890	32.27086	-16.38777	2019	3	18	10	40	6	229.66	-0.000
St 51	1	Trans. M6 600	57	10	POS533_C442	50	1	1			1	1	1										50.0	50.3	18.4129	36.6945	229.30	0.282	12.890	1026.4692	1026.6872	32.27086	-16.38776	2019	3	18	10	40	10	NaN	-0.007
St 51	1	Trans. M6 600	57	11	POS533_C443	10											1	1	1	1	1		10.2	10.2	18.4288	36.7005	229.73	0.229	29.380	1026.4680	1026.5124	32.27087	-16.38768	2019	3	18	10	42	25	230.18	0.005
St 51	1	Trans. M6 600	57	12	POS533_C444	10	1	1			1	1	1		1								9.7	9.8	18.4310	36.7011	229.31	0.233	31.853	1026.4679	1026.5102	32.27086	-16.38768	2019	3	18	10	42	32	NaN	0.000
St 52	1	II. Desert. S 600	58	1	POS533_C445	150	1	1			1						1	1					149.3	150.4	18.1769	36.6201	225.61	0.211	0.333	1026.4759	1027.1274	32.40422	-16.52668	2019	3	18	13	2	20	226.19	-0.001
St 52	1	II. Desert. S 600	58	2	POS533_C446	120					1						1	1					120.3	121.2	18.2408	36.6274	225.78	0.160	1.200	1026.4642	1026.9894	32.40424	-16.52654	2019	3	18	13	3	28	225.70	0.005
St 52	1	II. Desert. S 600	58	3	POS533_C447	100											1	1	1	1	1		100.0	100.8	18.4706	36.6735	226.02	0.170	2.722	1026.4408	1026.8770	32.40420	-16.52640	2019	3	18	13	4	12	226.06	-0.001
St 52	1	II. Desert. S 600	58	4	POS533_C448	100	1				1												100.0	100.7	18.4813	36.6766	226.15	0.169	2.620	1026.4404	1026.8763	32.40418	-16.52640	2019	3	18	13	4	14	NaN	-0.003
St 52	1	II. Desert. S 600	58	5	POS533_C449	75													1	1	1		75.5	76.0	18.5302	36.6854	228.89	0.240	6.684	1026.4337	1026.7629	32.40410	-16.52624	2019	3	18	13	5	7	NaN	0.009
St 52	1	II. Desert. S 600	58	6	POS533_C450	75	1	1			1												75.5	76.0	18.5303	36.6854	229.00	0.240	6.148	1026.4336	1026.7628	32.40410	-16.52624	2019	3	18	13	5	9	NaN	0.004
St 52	1	II. Desert. S 600	58	7	POS533_C451	50											1	1	1	1	1		50.9	51.2	18.5274	36.6854	229.04	0.324	22.456	1026.4332	1026.6551	32.40397	-16.52608	2019	3	18	13	6	1	229.62	0.001
St 52	1	II. Desert. S 600	58	8	POS533_C452	50	1				1												50.9	51.3	18.5270	36.6854	229.19	0.291	22.573	1026.4334	1026.6555	32.40396	-16.52606	2019	3	18	13	6	4	NaN	0.005
St 52	1	II. Desert. S 600	58	9	POS533_C453	25													1	1	1		25.5	25.7	18.5322	36.6851	229.25	0.136	40.343	1026.4307	1026.5418	32.40388	-16.52590	2019	3	18	13	7	14	NaN	0.001
St 52	1	II. Desert. S 600	58	10	POS533_C454	25	1				1												25.8	26.0	18.5323	36.6851	228.79	0.149	39.263	1026.4306	1026.5432	32.40390	-16.52592	2019	3	18	13	7	16	NaN	-0.001
St 52	1	II. Desert. S 600	58	11	POS533_C455	10											1	1	1	1	1		8.9	8.9	18.5484	36.6867	228.97	0.080	73.291	1026.4270	1026.4657	32.40395	-16.52582	2019	3	18	13	8	19	228.94	0.003
St 52	1	II. Desert. S 600	58	12	POS533_C456	10	1	1			1												8.8	8.9	18.5467	36.6864	229.69	0.070	84.682	1026.4272	1026.4658	32.40394	-16.52582	2019	3	18	13	8	21	NaN	0.003
St 53	1	II. Desert. N 600	59	1	POS533_C457	140											1	1					140.1	141.2	17.5784	36.5122	217.16	0.082	0.299	1026.5410	1027.1541	32.56398	-16.58054	2019	3	18	15	29	40	217.93	0.003
St 53	1	II. Desert. N 600	59	2	POS533_C458	140	1	1			1	1	1		1								140.3	141.3	17.5566	36.5077	217.00	0.075	0.305	1026.5428	1027.1567	32.56398	-16.58053	2019	3	18	15	29	50	NaN	0.011
St 53	1	II. Desert. N 600	59	3	POS533_C459	100											1	1	1		1		100.1	100.9	18.6257	36.7199	224.48	0.399	1.921	1026.4369	1026.8733	32.56397	-16.58052	2019	3	18	15	31	6	230.20	0.003
St 53	1	II. Desert. N 600	59	4	POS533_C460	100	1				1	1	1										100.2	100.9	18.6250	36.7193	224.51	0.252	2.015	1026.4366	1026.8731	32.56395	-16.58051	2019	3	18	15	31	19	NaN	0.004
St 53	1	II. Desert. N 600	59	5	POS533_C461	90											1	1	1		1		90.7	91.4	18.5624	36.6921	228.24	0.356	3.316	1026.4313	1026.8268	32.56397	-16.58056	2019	3	18	15	32	18	227.11	0.012
St 53	1	II. Desert. N 600	59	6	POS533_C462	90	1	1			1	1	1		1								90.6	91.2	18.5588	36.6907	228.12	0.388	3.381	1026.4312	1026.8260	32.56393	-16.58058	2019	3	18	15	32	39	NaN	0.013
St 53	1	II. Desert. N 600	59	7	POS533_C463	60											1	1	1		1		61.0	61.5	18.5489	36.6768	230.76	0.161	21.449	1026.4217	1026.6878	32.56382	-16.58064	2019	3	18	15	34	11	230.51	0.011
St 53	1	II. Desert. N 600	59	8	POS533_C464	60	1				1	1	1										61.0	61.5	18.5502	36.6769	229.78	0.131	19.929	1026.4214	1026.6875	32.56380	-16.58064	2019	3	18	15	34	36	NaN	0.010
St 53	1	II. Desert. N 600	59	9	POS533_C465	30											1	1	1		1		28.8	29.0	18.5921	36.6848	231.06	0.057	51.322	1026.4153	1026.5411	32.56388	-16.58069	2019	3	18	15	35	51	231.56	0.033
St 53	1	II. Desert. N 600	59	10	POS533_C466	30	1				1	1	1										29.9	30.1	18.5888	36.6839	230.62	0.041	50.111	1026.4156	1026.5459	32.56390	-16.58071	2019	3	18	15	35	59	NaN	0.018
St 53	1	II. Desert. N 600	59	11	POS533_C467	10											1	1	1		1		10.2	10.2	18.7219	36.7064	230.00	-0.005	139.040	1026.3979	1026.4423	32.56394	-16.58072	2019	3	18	15	36	54	231.21	0.003
St 53	1	II. Desert. N 600	59	12	POS533_C468	10	1	1			1	1	1		1								9.9	9.9	18.7180	36.7063	230.55	0.014	142.260	1026.3989	1026.4419	32.56394	-16.58071	2019	3	18	15	37	3	NaN	0.007
St 54	1	Ridge M 600	60	1	POS533_C469	300		1			1						1	1					297.8	300.1	13.3040	35.7966	196.21	-0.052	0.000	1026.9570	1028.2829	32.64668	-16.59082	2019	3	18	17	15	6	195.48	-0.016
St 54	1	Ridge M 600	60	2	POS533_C470	260					1						1	1					256.9	258.8	14.6564	35.9878	200.37	-0.029	0.000	1026.8180	1027.9550	32.64650	-16.59100	2019	3	18	17	16	37	202.08	-0.016
St 54	1	Ridge M 600	60	3	POS533_C471	240					1						1	1					237.0	238.8	16.1055	36.2272	205.83	0.001	0.000	1026.6766	1027.7190	32.64640	-16.59103	2019	3	18	17	17	33	207.71	-0.013
St 54	1	Ridge M 600	60	4	POS533_C472	200	1	1			1						1	1					198.5	200.0	16.4719	36.2945	208.56	0.022	0.000	1026.6415	1027.5136	32.64639	-16.59102	2019	3	18	17	19	3	210.26	-0.010
St 54	1	Ridge M 600	60	5	POS533_C473	120											1	1					119.0	119.9	18.3608	36.6653	228.34	0.251	0.204	1026.4630	1026.9823	32.64634	-16.59112	2019	3	18	17	21	3	228.02	-0.003
St 54	1	Ridge M 600	60	6	POS533_C474	120	1				1						1	1	1	1	1		119.4	120.2	18.3525	36.6638	227.66	0.235	0.203	1026.4640	1026.9846	32.64632	-16.59113	2019	3	18	17	21	11	NaN	-0.001
St 54	1	Ridge M 600	60	7	POS533_C475	64																	64.9	65.4	18.4288	36.6764	229.38	0.263	2.438	1026.4520	1026.7350	32.64632	-16.59101	2019	3	18	17	22	48	228.67	0.007
St 54	1	Ridge M 600	60	8	POS533_C476	64	1	1			1						1	1	1	1	1	1	65.2	65.6	18.4301	36.6762	228.80	0.279	2.411	1026.4515	1026.7357	32.64630	-16.59098	2019	3	18	17	23	0	NaN	0.018
St 54	1	Ridge M 600	60	9	POS533_C477	30																	29.9	30.1	18.4966	36.6808	229.15	0.259	24.148	1026.4366	1026.5670	32.64630	-16.59086	2019	3	18	17	24	51	230.98	-0.000
St 54	1	Ridge M 600	60	10	POS533_C478	30	1				1						1	1	1	1	1		28.9	29.1	18.5183	36.6832	228.87	0.290	27.601	1026.4329	1026.5589	32.64628	-16.59085	2019	3	18	17	24	55	NaN	-0.007
St 54	1	Ridge M 600	60	11	POS533_C479	10																	9.0	9.1	18.5277	36.6835	229.92	0.278	141.550	1026.4299	1026.4693	32.64620	-16.59086	2019	3	18	17	26	2	230.94	-0.004
St 54	1	Ridge M 600	60	12	POS533_C480	10	1	1			1						1	1	1	1	1		9.2	9.3	18.5512	36.6869	230.45	0.286	135.220	1026.4264	1026.4667	32.64616	-16.59087	2019	3	18	17	26	16	NaN	-0.003
St 55	1	Trans. M7 300	61	1	POS533_C499	115											1	1					114.6	115.5	16.8249	36.3516	213.23	0.064	0.017	1026.5986	1027.1018	32.73719	-16.59932	2019	3	18	18	44	50	212.83	-0.001
St 55	1	Trans. M7 300	61	2	POS533_C500	115	1	1			1	1	1		1								114.6	115.4	16.8312	36.3527	213.07	0.086	0.017	1026.5980	1027.1011	32.73719	-16.59933	2019	3	18	18	44	55	NaN	0.002
St 55	1	Trans. M7 300	61	3	POS533_C501	80											1	1	1		1		80.6	81.2	17.7148	36.5190	219.94	0.176	0.132	1026.5102	1026.8627	32.73716	-16.59930	2019	3	18	18	46	32	220.95	-0.002
St 55	1	Trans. M7 300	61	4	POS533_C502	80					1	1	1										81.2	81.8	17.6991	36.5161	219.76	0.183	0.129	1026.5119	1026.8672	32.73717	-16.59930	2019	3	18	18	46	37	NaN	0.008
St 55	1	Trans. M7 300	61	5	POS533_C503	60													1		1		59.9	60.3	18.1842	36.6113	228.87	0.478	0.431	1026.4634	1026.7251	32.73711	-16.59922	2019	3	18	18	47	54	NaN	0.009
St 55	1	Trans. M7 300	61	6	POS533_C504	60	1				1	1	1										61.4	61.9	18.1799	36.6105	228.99	0.477	0.395	1026.4640	1026.7322	32.73711	-16.59922	2019	3	18	18	47	56	NaN	0.014
St 55	1	Trans. M7 300	61	7	POS533_C505	50											1	1	1		1		50.6	51.0	18.3479	36.6440	228.04	0.358	0.712	1026.4469	1026.6679	32.73717	-16.59912	2019	3	18	18	48	53	227.65	-0.000
St 55	1	Trans. M7 300	61	8	POS533_C506	50	1	1			1	1	1		1								51.4	51.8	18.3265	36.6399	228.64	0.353	0.686	1026.4492	1026.6737	32.73718	-16.59912	2019	3	18	18	48	55	NaN	0.001
St 55	1	Trans. M7 300	61	9	POS533_C507	40													1				41.1	41.4	18.3787	36.6504	228.16	0.269	1.121	1026.4437	1026.6231	32.73728	-16.59898	2019	3	18	18	49	51	NaN	-0.024
St 55	1	Trans. M7 300	61	10	POS533_C508	40	1				1	1	1										41.5	41.8	18.3540	36.6453	228.32	0.266	1.113	1026.4459	1026.6269	32.73728	-16.59898	2019	3	18	18	49	52	NaN	-0.022
St 55	1	Trans. M7 300	61	11	POS533_C509	10											1	1	1		1		10.2	10.3	18.4742	36.6712	229.69	0.310	6.204	1026.4340	1026.4786	32.73732	-16.59886	2019	3	18	18	51	18	228.80	0.003
St 55	1	Trans. M7 300	61	12	POS533_C510	10	1	1			1	1	1		1								9.4	9.4	18.4716	36.6707	229.41	0.335	6.578	1026.4343	1026.4751	32.73730	-16.59886	2019	3	18	18	51	21	NaN	0.008
St 56	1	Trans. M8 100	62	1	POS533_C511	220	1	1			1				1	1	1	1					219.0	220.7	15.7789	36.1754	207.46	0.011	0.000	1026.7111	1027.6761	32.72254	-16.70994	2019	3	18	20	33	9	207.74	0.004
St 56	1	Trans. M8 100	62	2	POS533_C512	180					1						1	1					179.7	181.0	16.6280	36.3175	212.78	0.053	0.000	1026.6217	1027.4107	32.72257	-16.70982	2019	3	18	20	35	4	213.47	0.002
St 56	1	Trans. M8 100	62	3	POS533_C513	120											1	1	1	1	1		120.6	121.5	17.7073	36.5166	222.69	0.257	0.000	1026.5119	1027.0394	32.72239	-16.70969	2019	3	18	20	36	49	222.97	0.022
St 56	1	Trans. M8 100	62	4	POS533_C514	120	1	1			1					1							120.7	121.6	17.7115	36.5177	223.22	0.305	0.000	1026.5117	1027.0397	32.72237	-16.70968	2019	3	18	20	37	2	NaN	0.010
St 56	1	Trans. M8 100	62	5	POS533_C515	100													1	1	1		101.3	102.0	17.6969	36.5153	223.34	0.314	0.000	1026.5126	1026.9558	32.72220	-16.70962	2019	3	18	20	38	8	NaN	0.018

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP's	Oxygen	DIC	Pigments	Cocco	Pico-Pl	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 56	1	Trans. M8 100	62	6	POS533_C516	100	1				1												101.5	102.2	17.6973	36.5155	222.91	0.259	0.000	1026.5127	1026.9565	32.72218	-16.70959	2019	3	18	20	38	24	NaN	0.031
St 56	1	Trans. M8 100	62	7	POS533_C517	60											1	1	1	1	1		59.4	59.8	18.0026	36.5739	227.16	0.484	0.000	1026.4801	1026.7396	32.72194	-16.70936	2019	3	18	20	40	30	227.49	0.014
St 56	1	Trans. M8 100	62	8	POS533_C518	60	1	1			1				1	1							59.3	59.7	18.0012	36.5736	226.99	0.473	0.000	1026.4802	1026.7395	32.72193	-16.70934	2019	3	18	20	40	36	NaN	0.024
St 56	1	Trans. M8 100	62	9	POS533_C519	30											1	1	1	1	1		31.6	31.8	18.3400	36.6372	231.23	0.596	0.000	1026.4429	1026.5808	32.72182	-16.70914	2019	3	18	20	42	8	231.28	0.019
St 56	1	Trans. M8 100	62	10	POS533_C520	30	1	1			1					1							31.6	31.8	18.3401	36.6374	231.30	0.722	0.000	1026.4430	1026.5809	32.72182	-16.70912	2019	3	18	20	42	15	NaN	0.037
St 56	1	Trans. M8 100	62	11	POS533_C521	10											1	1	1	1	1		9.6	9.7	18.3291	36.6375	231.35	0.602	0.000	1026.4448	1026.4868	32.72178	-16.70902	2019	3	18	20	43	27	231.36	0.030
St 56	1	Trans. M8 100	62	12	POS533_C522	10	1	1			1				1	1							9.5	9.5	18.3345	36.6379	230.96	0.587	0.000	1026.4438	1026.4851	32.72178	-16.70900	2019	3	18	20	43	32	NaN	0.032
St 57	1	Trans. M9 600	63	1	POS533_C523	340		1			1			1	1		1	1					340.3	342.9	14.0943	35.9036	198.44	-0.048	0.000	1026.8764	1028.3853	32.61322	-16.79768	2019	3	18	22	41	20	198.46	-0.018
St 57	1	Trans. M9 600	63	2	POS533_C524	200	1				1	1	1	1	1		1	1					199.1	200.6	16.7407	36.3365	213.03	0.069	0.000	1026.6104	1027.4841	32.61321	-16.79744	2019	3	18	22	44	10	212.06	0.011
St 57	1	Trans. M9 600	63	3	POS533_C525	120											1	1	1	1	1		120.7	121.6	17.9407	36.5610	225.97	0.369	0.000	1026.4883	1027.0155	32.61308	-16.79728	2019	3	18	22	46	6	225.98	0.006
St 57	1	Trans. M9 600	63	4	POS533_C526	120	1	1			1	1	1										120.9	121.8	17.9403	36.5610	226.04	0.325	0.000	1026.4884	1027.0167	32.61308	-16.79728	2019	3	18	22	46	10	NaN	0.012
St 57	1	Trans. M9 600	63	5	POS533_C527	90											1	1	1	1	1		90.7	91.4	17.9647	36.5670	225.91	0.336	0.000	1026.4856	1026.8821	32.61294	-16.79704	2019	3	18	22	47	39	226.95	0.009
St 57	1	Trans. M9 600	63	6	POS533_C528	90	1				1	1	1										91.2	91.9	17.9619	36.5666	226.28	0.340	0.000	1026.4860	1026.8846	32.61294	-16.79704	2019	3	18	22	47	42	NaN	0.041
St 57	1	Trans. M9 600	63	7	POS533_C529	70											1	1	1	1	1		69.9	70.5	18.2011	36.6167	227.08	0.448	0.000	1026.4638	1026.7692	32.61291	-16.79696	2019	3	18	22	49	19	228.87	0.011
St 57	1	Trans. M9 600	63	8	POS533_C530	70	1	1			1	1	1										69.1	69.6	18.2035	36.6169	227.08	0.426	0.000	1026.4633	1026.7652	32.61290	-16.79696	2019	3	18	22	49	24	NaN	0.007
St 57	1	Trans. M9 600	63	9	POS533_C531	40													1	1	1		42.2	42.5	18.5329	36.6813	229.72	0.350	0.000	1026.4283	1026.6122	32.61282	-16.79684	2019	3	18	22	50	40	NaN	0.005
St 57	1	Trans. M9 600	63	10	POS533_C532	40	1				1	1	1	1	1								41.7	42.0	18.5483	36.6839	229.40	0.359	0.000	1026.4264	1026.6083	32.61282	-16.79684	2019	3	18	22	50	43	NaN	0.004
St 57	1	Trans. M9 600	63	11	POS533_C533	10											1	1	1	1	1		9.4	9.4	18.5696	36.6893	230.60	0.271	0.000	1026.4237	1026.4645	32.61270	-16.79662	2019	3	18	22	52	15	229.85	0.003
St 57	1	Trans. M9 600	63	12	POS533_C534	10	1	1			1	1	1										9.3	9.3	18.5717	36.6897	230.87	0.293	0.000	1026.4234	1026.4639	32.61270	-16.79662	2019	3	18	22	52	17	NaN	0.010
St 58	1	Trans. M10 600	64	1	POS533_C535	500		1			1												495.9	500.0	11.9217	35.6240	198.66	-0.040	0.000	1027.1017	1029.3199	32.60397	-17.05470	2019	3	19	1	32	38	NaN	-0.019
St 58	1	Trans. M10 600	64	2	POS533_C536	250		1			1												248.9	250.9	15.3578	36.1016	197.30	-0.045	0.000	1026.7506	1027.8491	32.60396	-17.05458	2019	3	19	1	37	50	NaN	-0.025
St 58	1	Trans. M10 600	64	3	POS533_C537	120													1	1	1		120.6	121.5	18.7072	36.7582	219.64	0.073	0.000	1026.4464	1026.9718	32.60408	-17.05438	2019	3	19	1	40	47	NaN	-0.003
St 58	1	Trans. M10 600	64	4	POS533_C538	120	1				1												121.1	121.9	18.7012	36.7564	219.71	0.056	0.000	1026.4466	1026.9738	32.60408	-17.05438	2019	3	19	1	40	49	NaN	-0.002
St 58	1	Trans. M10 600	64	5	POS533_C539	90													1	1	1		91.6	92.2	18.7975	36.7796	225.81	0.300	0.000	1026.4384	1026.8372	32.60406	-17.05436	2019	3	19	1	42	8	NaN	-0.008
St 58	1	Trans. M10 600	64	6	POS533_C540	90	1				1												91.4	92.0	18.7985	36.7799	226.25	0.305	0.000	1026.4384	1026.8363	32.60406	-17.05436	2019	3	19	1	42	13	NaN	0.003
St 58	1	Trans. M10 600	64	7	POS533_C541	65													1	1	1		63.7	64.2	18.8077	36.7806	227.52	0.319	0.000	1026.4353	1026.7128	32.60400	-17.05438	2019	3	19	1	43	35	NaN	-0.000
St 58	1	Trans. M10 600	64	8	POS533_C542	65	1	1			1												63.4	63.8	18.8068	36.7803	227.67	0.317	0.000	1026.4353	1026.7113	32.60398	-17.05438	2019	3	19	1	43	50	NaN	-0.006
St 58	1	Trans. M10 600	64	9	POS533_C543	40													1	1	1		41.9	42.2	18.8099	36.7679	228.82	0.093	0.000	1026.4240	1026.6067	32.60397	-17.05439	2019	3	19	1	44	51	NaN	-0.001
St 58	1	Trans. M10 600	64	10	POS533_C544	40	1	1			1												42.5	42.8	18.8093	36.7677	228.99	0.072	0.000	1026.4240	1026.6090	32.60396	-17.05438	2019	3	19	1	44	54	NaN	0.001
St 58	1	Trans. M10 600	64	11	POS533_C545	10													1	1	1		9.4	9.5	19.0130	36.7835	228.92	0.046	0.000	1026.3822	1026.4232	32.60398	-17.05436	2019	3	19	1	45	58	NaN	0.001
St 58	1	Trans. M10 600	64	12	POS533_C546	10	1	1			1												9.9	9.9	19.0133	36.7837	228.83	0.061	0.000	1026.3823	1026.4252	32.60398	-17.05436	2019	3	19	1	46	0	NaN	-0.001
St 59	1	Trans. M11 600	65	1	POS533_C547	900		1			1												890.6	898.8	9.9026	35.6884	172.03	-0.044	0.000	1027.5251	1031.5333	32.69178	-17.20014	2019	3	19	3	24	39	NaN	-0.007
St 59	1	Trans. M11 600	65	2	POS533_C548	360		1			1												358.0	360.9	13.2639	35.7714	198.28	-0.053	0.000	1026.9475	1028.5411	32.69210	-17.20008	2019	3	19	3	33	15	NaN	-0.020
St 59	1	Trans. M11 600	65	3	POS533_C549	100													1	1	1		101.6	102.4	18.4767	36.6792	221.03	0.161	0.000	1026.4436	1026.8868	32.69190	-17.20014	2019	3	19	3	37	38	NaN	-0.010
St 59	1	Trans. M11 600	65	4	POS533_C550	100	1				1												101.6	102.4	18.4758	36.6795	220.76	0.146	0.000	1026.4441	1026.8873	32.69190	-17.20014	2019	3	19	3	37	40	NaN	-0.010
St 59	1	Trans. M11 600	65	5	POS533_C551	80													1	1	1		81.8	82.4	18.5681	36.6958	227.09	0.214	0.000	1026.4323	1026.7891	32.69180	-17.20014	2019	3	19	3	38	46	NaN	0.004
St 59	1	Trans. M11 600	65	6	POS533_C552	80	1	1			1												81.9	82.4	18.5679	36.6958	226.87	0.226	0.000	1026.4323	1026.7892	32.69180	-17.20014	2019	3	19	3	38	48	NaN	0.012
St 59	1	Trans. M11 600	65	7	POS533_C553	60													1	1	1		62.1	62.5	18.6070	36.7077	228.17	0.512	0.000	1026.4306	1026.7012	32.69174	-17.20022	2019	3	19	3	39	51	NaN	0.001
St 59	1	Trans. M11 600	65	8	POS533_C554	60	1	1			1												62.3	62.8	18.6056	36.7072	228.25	0.494	0.000	1026.4306	1026.7022	32.69170	-17.20026	2019	3	19	3	40	9	NaN	0.003
St 59	1	Trans. M11 600	65	9	POS533_C555	30													1	1	1		32.6	32.8	18.6656	36.7171	230.35	0.123	0.000	1026.4216	1026.5637	32.69168	-17.20032	2019	3	19	3	41	11	NaN	0.008
St 59	1	Trans. M11 600	65	10	POS533_C556	30	1	1			1												32.8	33.1	18.6657	36.7172	229.98	0.129	0.000	1026.4216	1026.5647	32.69168	-17.20032	2019	3	19	3	41	13	NaN	0.002
St 59	1	Trans. M11 600	65	11	POS533_C557	10													1	1	1		8.9	8.9	18.7219	36.7253	229.95	0.085	0.000	1026.4123	1026.4511	32.69166	-17.20040	2019	3	19	3	42	53	NaN	0.004
St 59	1	Trans. M11 600	65	12	POS533_C558	10	1	1			1												9.1	9.2	18.7216	36.7254	230.40	0.088	0.000	1026.4125	1026.4522	32.69166	-17.20040	2019	3	19	3	42	56	NaN	0.000
St 60	1	Trans. M12 600	66	1	POS533_C559	1000		1			1						1	1					988.9	998.3	9.5349	35.7280	175.15	-0.033	0.000	1027.6198	1032.0743	32.78690	-17.38200	2019	3	19	6	7	33	175.83	-0.017
St 60	1	Trans. M12 600	66	2	POS533_C560	600		1			1						1	1					593.4	598.5	11.5556	35.5959	194.70	-0.043	0.000	1027.1514	1029.8086	32.78676	-17.38153	2019	3	19	6	15	33	195.32	-0.016
St 60	1	Trans. M12 600	66	3	POS533_C561	200		1			1						1	1					200.0	201.6	15.9338	36.2069	198.33	-0.047	0.000	1026.6991	1027.5801	32.78694	-17.38152	2019	3	19	6	22	50	198.78	-0.011
St 60	1	Trans. M12 600	66	4	POS533_C562	170	1	1			1						1	1					171.6	172.9	16.3710	36.2738	201.56	-0.041	0.000	1026.6482	1027.4025	32.78692	-17.38148	2019	3	19	6	24	8	202.36	-0.019
St 60	1	Trans. M12 600	66	5	POS533_C563	100											1	1	1		1		102.0	102.8	17.4861	36.4574	209.17	0.030	0.000	1026.5199	1026.9667	32.78703	-17.38140	2019	3	19	6	26	0	209.13	-0.013
St 60	1	Trans. M12 600	66	6	POS533_C564	100	1				1												101.5	102.3	17.5068	36.4613	208.50	0.053	0.000	1026.5178	1026.9624	32.78703	-17.38140	2019	3	19	6	26	3	NaN	-0.011
St 60	1	Trans. M12 600	66	7	POS533_C565	80											1	1	1		1		82.5	83.1	18.4622	36.6952	229.80	0.350	0.000	1026.4587	1026.8184	32.78702	-17.38136	2019	3	19	6	26	56	229.65	0.019
St 60	1	Trans. M12 600	66	8	POS533_C566	80	1	1			1												82.4	83.0	18.4631	36.6955	229.53	0.336	0.000	1026.4587	1026.8180	32.78700	-17.38134	2019	3	19	6	27	2	NaN	0.012
St 60	1	Trans. M12 600	66	9	POS533_C567	40											1	1	1		1		39.2	39.4	18.4620	36.6972	229.76	0.379	0.000	1026.4583	1026.6291	32.78703	-17.38129	2019	3	19	6	28	36	229.58	0.009
St 60	1	Trans. M12 600	66	10	POS533_C568	40	1	1			1												39.4	39.7	18.4630	36.6971	229.80	0.355	0.000	1026.4580	1026.6301	32.78702	-17.38128	2019	3	19	6	28	39	NaN	0.007
St 60	1	Trans. M12 600	66	11	POS533_C569	10											1	1	1		1		10.2	10.3	18.4412	36.6974	230.22	0.349	0.000	1026.4624	1026.5069	32.78696	-17.38128	2019	3	19	6	29	47	230.06	0.009
St 60	1	Trans. M12 600	66	12	POS533_C570	10	1	1			1												10.7	10.8	18.4392	36.6976	230.08	0.311	0.000	1026.4631	1026.5099	32.78696	-17.38128	2019	3	19	6	29	58	NaN	0.012
St 62	1	Madeira C2 100	67	1	POS533_C571	150																	151.3	152.4	17.2452	36.4357	208.35	0.111	0.001	1026.5639	1027.2267	32.71827	-17.23746	2019	3	19	8	31	38	208.57	0.015
St 62	1	Madeira C2 100	67	2	POS533_C572	150	1	1			1	1	1		1		1	1					151.1	152.2	17.2597	36.4382	208.76	0.117	0.000	1026.5623	1027.2241	32.71826	-17.23745	2019	3	19	8	31	45	NaN	0.010
St 62	1	Madeira C2 100	67	3	POS533_C573	120																	122.3	123.2	17.7878	36.5424	214.73	0.203	0.078	1026.5119	1027.0466	32.71824	-17.23734	2019	3	19	8	32	47	213.26	0.024
St 62	1	Madeira C2 100	67	4	POS533_C574	120		1			1	1	1				1	1	1	1	1		121.9	122.8	17.7863	36.5437	214.04	0.176	0.081	1026.5133	1027.0462	32.71824	-17.23734	2019	3	19	8	32	49	NaN	0.029
St 62	1	Madeira C2 100	67	5	POS533_C575	100																	99.0	99.8	18.1995	36.6319	221.30	0.290	0.325	1026.4771	1026.9094	32.71824	-17.23732	2019	3	19	8	34	0	220.83	0.025
St 62	1	Madeira C2 100	67	6	POS533_C576	100	1				1	1	1		1		1	1	1	1	1		98.6	99.3	18.2058	36.6334	221.30	0.241	0.336	1026.4766	1026.9072	32.71824	-17.23732	2019	3	19	8	34	2	NaN	0.016
St 62	1	Madeira C2 100	67	7	POS533_C577	60																	60.3	60.8	18.5795	36.7084	227.25	0.356	2.766	1026.4380	1026.7011	32.71821	-17.23720	2019	3	19	8	36	9	227.45	0.007
St 62	1	Madeira C2 100	67	8	POS533_C578	60	1	1			1	1	1		1		1	1	1	1	1	1	60.6	61.0	18.5814	36.7088	227.20	0.406	2.738	1026.4379	1026.7021	32.71822	-17.23722	2019	3	19	8	36	11	NaN	0.009
St 62	1	Madeira C2 100	67	9	POS533_C579	30																	29.5	29.7	18.6464	36.7190	228.62	0.289	16.757	1026.4277	1026.5562	32.71814	-17.23712	2019	3	19	8	37	51	229.45	0.012
St 62	1	Madeira C2 100	67	10	POS533_C580	30	1	1			1	1	1				1	1	1	1	1		30.1	30.4	18.6497	36.7200	228.45	0.258	14.892	1026.4277	1026.5591	32.71814	-17.23712	2019	3	19	8	37	53	NaN	0.008
St 62	1	Madeira C2 100	67	11	POS533_C581	10																	9.6	9.7	18.6646	36.7241	229.41	0.066	18.252	1026.4261	1026.4680	32.71812	-17.23707	2019	3	19	8	39	0	231.26	0.001
St 62	1	Madeira C2 100	67	12	POS533_C582	10	1	1			1	1	1		1		1	1	1	1	1		10.3	10.4	18.6650	36.7243	229.31	0.061	17.364	1026.4262	1026.4711	32.71814	-17.23709	2019	3	19	8	39	2	NaN	0.012

Station-lable on cruise			Station numbering of CTD eval. (GK)	Bottle No.	Number	planned depth [m]	DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigments	Cocco	Pico-PI	Utermö	Actual depth of closure	Pressure	Temperature	Salinity	Oxygen	Fluoresence	PAR	Pot. density	Insitu density	Latitude	Longitude	Year	Month	Day	Hour	Minute	Second	Oxygen titrated	Turbidity
							300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20	300	m	dbar	°C		µmol/kg	raw	raw												raw
No.	Cast	Station Name																																						µmol/kg	
St 63	1	Madeira C3 100	68	1	POS533_C583	200											1	1					199.9	201.4	17.0208	36.3815	204.09	0.046	0.000	1026.5783	1027.4545	32.65170	-17.11336	2019	3	19	10	9	13	205.68	0.008
St 63	1	Madeira C3 100	68	2	POS533_C584	200	1	1			1												199.9	201.4	16.9861	36.3749	204.02	0.034	0.000	1026.5815	1027.4577	32.65172	-17.11335	2019	3	19	10	9	19	NaN	0.003
St 63	1	Madeira C3 100	68	3	POS533_C585	120											1	1	1		1		120.6	121.5	17.9902	36.5867	216.60	0.233	0.396	1026.4956	1027.0225	32.65178	-17.11326	2019	3	19	10	11	10	211.31	-0.004
St 63	1	Madeira C3 100	68	4	POS533_C586	120	1	1			1												120.8	121.7	17.9571	36.5807	216.39	0.176	0.390	1026.4993	1027.0271	32.65179	-17.11326	2019	3	19	10	11	12	NaN	-0.004
St 63	1	Madeira C3 100	68	5	POS533_C587	100											1	1	1		1		101.2	101.9	18.2823	36.6498	219.61	0.338	1.138	1026.4701	1026.9117	32.65182	-17.11326	2019	3	19	10	12	0	220.98	0.022
St 63	1	Madeira C3 100	68	6	POS533_C588	100	1				1												101.1	101.8	18.2815	36.6503	220.62	0.313	1.143	1026.4707	1026.9117	32.65182	-17.11326	2019	3	19	10	12	1	NaN	0.015
St 63	1	Madeira C3 100	68	7	POS533_C589	80											1	1	1		1		81.1	81.7	18.6377	36.7341	227.07	0.350	3.383	1026.4439	1026.7975	32.65188	-17.11319	2019	3	19	10	12	57	226.55	0.012
St 63	1	Madeira C3 100	68	8	POS533_C590	80	1	1			1												81.1	81.7	18.6369	36.7344	226.04	0.396	3.352	1026.4443	1026.7979	32.65188	-17.11318	2019	3	19	10	13	1	NaN	0.012
St 63	1	Madeira C3 100	68	9	POS533_C591	40											1	1	1		1		42.3	42.6	18.6594	36.7211	228.34	0.273	29.079	1026.4266	1026.6112	32.65188	-17.11304	2019	3	19	10	14	47	229.50	-0.002
St 63	1	Madeira C3 100	68	10	POS533_C592	40	1	1			1												41.7	42.0	18.6611	36.7216	228.48	0.277	30.170	1026.4266	1026.6081	32.65188	-17.11304	2019	3	19	10	14	49	NaN	0.003
St 63	1	Madeira C3 100	68	11	POS533_C593	10											1	1	1		1		8.9	9.0	18.7460	36.7297	229.37	0.019	27.393	1026.4096	1026.4485	32.65192	-17.11294	2019	3	19	10	16	21	231.48	0.004
St 63	1	Madeira C3 100	68	12	POS533_C594	10	1	1			1												9.3	9.3	18.7444	36.7298	229.68	0.011	26.535	1026.4101	1026.4505	32.65193	-17.11294	2019	3	19	10	16	23	NaN	0.003
St 64	1	Madeira C4 100	69	1	POS533_O_535	600																	599.7	604.8	11.6023	35.6259	184.26	-0.042	0.000	1027.1662	1029.8505	32.62336	-16.88628	2019	3	19	12	30	16	NaN	-0.010
St 64	1	Madeira C4 100	69	2	POS533_O_536	460																	455.6	459.3	12.6399	35.7141	193.34	-0.037	0.000	1027.0312	1029.0631	32.62303	-16.88640	2019	3	19	12	33	23	NaN	0.003
St 64	1	Madeira C4 100	69	3	POS533_O_537	200																	201.7	203.2	16.7080	36.3195	209.19	-0.019	0.000	1026.6052	1027.4906	32.62276	-16.88632	2019	3	19	12	38	12	NaN	-0.001
St 64	1	Madeira C4 100	69	4	POS533_O_538	200	1	1		1	1	1			1								201.6	203.2	16.7087	36.3194	209.31	-0.012	0.000	1026.6049	1027.4900	32.62274	-16.88632	2019	3	19	12	38	14	NaN	0.014
St 64	1	Madeira C4 100	69	5	POS533_O_539	80																	81.4	82.0	18.3472	36.6558	223.96	0.329	4.831	1026.4575	1026.8129	32.62266	-16.88628	2019	3	19	12	40	47	NaN	0.039
St 64	1	Madeira C4 100	69	6	POS533_O_540	80	1	1		1	1	1			1								81.5	82.1	18.3278	36.6511	224.14	0.358	4.943	1026.4588	1026.8146	32.62266	-16.88628	2019	3	19	12	40	49	NaN	0.043
St 64	1	Madeira C4 100	69	7	POS533_O_541	60																	61.6	62.0	18.7107	36.7247	229.72	0.149	14.860	1026.4172	1026.6856	32.62262	-16.88624	2019	3	19	12	42	7	NaN	0.011
St 64	1	Madeira C4 100	69	8	POS533_O_542	60	1	1		1	1	1											61.5	62.0	18.7121	36.7251	230.06	0.143	15.034	1026.4171	1026.6853	32.62262	-16.88624	2019	3	19	12	42	10	NaN	0.012
St 64	1	Madeira C4 100	69	9	POS533_O_543	40																	40.1	40.4	18.7601	36.7149	230.72	0.177	27.753	1026.3961	1026.5708	32.62258	-16.88620	2019	3	19	12	43	14	NaN	0.022
St 64	1	Madeira C4 100	69	10	POS533_O_544	40	1	1		1	1	1											40.0	40.3	18.7601	36.7148	231.00	0.180	29.242	1026.3960	1026.5704	32.62258	-16.88620	2019	3	19	12	43	16	NaN	0.016
St 64	1	Madeira C4 100	69	11	POS533_O_545	10																	9.2	9.3	18.7850	36.7060	232.21	0.056	229.140	1026.3814	1026.4216	32.62256	-16.88620	2019	3	19	12	44	27	NaN	0.021
St 64	1	Madeira C4 100	69	12	POS533_O_546	10	1	1		1	1	1			1								9.4	9.4	18.7848	36.7061	232.02	0.059	205.700	1026.3816	1026.4224	32.62256	-16.88620	2019	3	19	12	44	29	NaN	0.022

7.3 Underway Sample List

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
28.02.2019 09:00	POS533_UW_000		1			1	1									
28.02.2019 12:00	POS533_UW_001	1	1			1	1							1		1
28.02.2019 15:00	POS533_UW_002		1			1	1							1		1
28.02.2019 18:00	POS533_UW_003	1	1			1	1									
28.02.2019 21:00	POS533_UW_004	1	1			1	1							1		1
01.03.2019 00:00	POS533_UW_005	1	1			1	1									
01.03.2019 03:00	POS533_UW_006	1	1			1	1							1		1
01.03.2019 06:00	POS533_UW_007	1	1			1	1									
01.03.2019 09:00	POS533_UW_008	1	1			1	1							1		1
01.03.2019 12:00	POS533_UW_009	1	1	1		1	1							1		1
01.03.2019 15:00	POS533_UW_010	1	1	1		1	1							1		1
01.03.2019 18:00	POS533_UW_011	1	1	1		1	1							1		1
01.03.2019 21:00	POS533_UW_012	1	1	1		1	1									
02.03.2019 00:00	POS533_UW_013	1	1	1		1	1							1		1
02.03.2019 03:00	POS533_UW_014	1	1	1		1	1									
02.03.2019 06:00	POS533_UW_015	1	1	1		1	1									
02.03.2019 09:00	POS533_UW_016	1	1	1		1	1									
02.03.2019 12:00	POS533_UW_017															
02.03.2019 15:00	POS533_UW_018		1	1		1	1							1		1
02.03.2019 19:30	POS533_UW_019	1	1	1		1	1						1	1		1
02.03.2019 22:30	POS533_UW_020	1	1	1		1	1						1	1		1
02.03.2019 23:30	POS533_UW_021	1	1	1		1	1						1	1		1
03.03.2019 02:15	POS533_UW_022	1	1	1		1	1						1	1		1
03.03.2019 03:33	POS533_UW_023	1	1	1		1	1							1		1
03.03.2019 06:33	POS533_UW_024	1	1	1		1	1							1		1
03.03.2019 07:33	POS533_UW_025	1	1	1		1	1							1		1
03.03.2019 10:15	POS533_UW_026	1	1	1		1	1		1	1				1		1
03.03.2019 11:33	POS533_UW_027	1	1	1		1	1		1	1				1		1

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
03.03.2019 14:33	POS533_UW_028	1	1	1		1	1		1	1				1		1
03.03.2019 15:33	POS533_UW_029	1	1	1		1	1		1	1				1		1
03.03.2019 18:00	POS533_UW_030		1				1									
03.03.2019 21:00	POS533_UW_031	1	1	1		1	1							1		1
04.03.2019 00:00	POS533_UW_032	1	1	1		1	1									
04.03.2019 03:00	POS533_UW_033	1	1	1		1	1									
04.03.2019 06:00	POS533_UW_034	1	1	1		1	1									
04.03.2019 09:00	POS533_UW_035		1			1			1	1						
04.03.2019 12:00	POS533_UW_036	1	1	1		1	1							1		1
04.03.2019 15:00	POS533_UW_037	1	1	1		1	1							1		1
04.03.2019 18:00	POS533_UW_038	1	1	1		1								1		1
04.03.2019 21:00	POS533_UW_039	1	1	1		1	1							1		1
05.03.2019 00:00	POS533_UW_040	1	1	1		1	1							1		1
05.03.2019 03:00	POS533_UW_041	1	1	1		1	1							1		1
05.03.2019 06:00	POS533_UW_042	1	1	1		1	1							1		1
05.03.2019 09:00	POS533_UW_043	1	1	1		1	1							1		1
05.03.2019 12:00	POS533_UW_044	1	1	1		1	1							1		1
05.03.2019 15:00	POS533_UW_045	1	1	1		1	1							1		1
05.03.2019 18:00	POS533_UW_046	1	1	1		1	1							1		1
05.03.2019 21:00	POS533_UW_047															
06.03.2019 00:00	POS533_UW_048	1	1			1								1		1
06.03.2019 03:00	POS533_UW_049	1	1	1		1	1							1		1
06.03.2019 06:00	POS533_UW_050	1	1	1		1	1							1		1
06.03.2019 09:00	POS533_UW_051	1	1	1		1	1							1		1
06.03.2019 12:00	POS533_UW_052	1	1	1		1	1							1		1
06.03.2019 15:00	POS533_UW_053	1	1	1		1	1							1		1
06.03.2019 18:00	POS533_UW_054	1	1	1		1	1							1		1
06.03.2019 21:00	POS533_UW_055	1	1	1		1	1							1		1

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
07.03.2019 00:00	POS533_UW_056	1	1	1		1	1							1		1
07.03.2019 03:00	POS533_UW_057	1	1	1		1	1							1		1
07.03.2019 06:00	POS533_UW_058	1	1	1		1	1							1		1
07.03.2019 09:00	POS533_UW_059	1	1	1		1	1							1		1
07.03.2019 12:00	POS533_UW_060	1	1	1		1	1							1		1
07.03.2019 15:00	POS533_UW_061	1	1	1		1	1							1		1
07.03.2019 18:00	POS533_UW_062	1	1	1		1	1							1		1
07.03.2019 21:00	POS533_UW_063	1	1	1		1	1							1		1
08.03.2019 00:00	POS533_UW_064	1	1	1		1	1							1		1
08.03.2019 03:00	POS533_UW_065	1	1	1		1	1							1		1
08.03.2019 06:00	POS533_UW_066	1	1	1		1	1							1		1
08.03.2019 09:00	POS533_UW_067	1	1	1		1	1							1		1
08.03.2019 12:00	POS533_UW_068	1	1	1		1	1							1		1
08.03.2019 15:00	POS533_UW_069	1	1	1		1	1							1		1
08.03.2019 18:00	POS533_UW_070	1	1	1		1	1							1		1
08.03.2019 21:00	POS533_UW_071	1	1	1		1	1							1		1
09.03.2019 00:00	POS533_UW_072	1	1	1		1	1							1		1
09.03.2019 03:00	POS533_UW_073	1	1	1		1	1							1		1
09.03.2019 06:00	POS533_UW_074	1	1	1		1	1							1		1
09.03.2019 09:00	POS533_UW_075	1	1	1		1	1							1		1
09.03.2019 12:00	POS533_UW_076	1	1	1		1	1							1		1
09.03.2019 15:00	POS533_UW_077	1	1	1		1	1							1		1
09.03.2019 18:00	POS533_UW_078	1	1	1		1	1							1		1
09.03.2019 21:00	POS533_UW_079	1	1	1		1	1							1		1
10.03.2019 00:00	POS533_UW_080	1	1	1		1	1							1		1
10.03.2019 03:00	POS533_UW_081	1	1	1		1	1							1		1
10.03.2019 06:00	POS533_UW_082	1	1	1		1	1							1		1
10.03.2019 09:00	POS533_UW_083	1	1	1		1	1							1		1

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
10.03.2019 12:00	POS533_UW_084	1	1	1		1	1							1		1
10.03.2019 15:00	POS533_UW_085	1	1	1		1	1							1		1
10.03.2019 18:00	POS533_UW_086	1	1	1		1	1							1		1
10.03.2019 21:00	POS533_UW_087	1	1	1		1	1							1		1
11.03.2019 00:00	POS533_UW_088	1	1			1										
11.03.2019 03:00	POS533_UW_089	1	1			1	1									
11.03.2019 06:00	POS533_UW_090			1		1	1							1		1
11.03.2019 09:00	POS533_UW_091													1		1
11.03.2019 12:00	POS533_UW_092	1	1			1	1							1		1
11.03.2019 14:00	POS533_UW_093	1	1	1		1	1									
11.03.2019 18:00	POS533_UW_094	1	1	1		1	1									
11.03.2019 21:00	POS533_UW_095															
12.03.2019 00:00	POS533_UW_096													1		1
12.03.2019 03:30	POS533_UW_097	1	1			1	1									
12.03.2019 06:00	POS533_UW_098	1	1	1		1	1									
12.03.2019 09:00	POS533_UW_099		1	1		1	1									
12.03.2019 12:00	POS533_UW_100		1	1		1	1									
12.03.2019 16:00	POS533_UW_101		1													
12.03.2019 18:00	POS533_UW_102		1			1	1									
12.03.2019 21:00	POS533_UW_103															
13.03.2019 00:00	POS533_UW_104	1	1			1	1									
13.03.2019 03:00	POS533_UW_105	1	1			1										
13.03.2019 06:00	POS533_UW_106	1	1			1	1									
13.03.2019 09:00	POS533_UW_107	1	1			1	1									
13.03.2019 12:00	POS533_UW_108	1	1			1	1									
13.03.2019 16:15	POS533_UW_109		1													
13.03.2019 18:00	POS533_UW_110		1			1	1									
13.03.2019 23:00	POS533_UW_111	1	1			1										

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
14.03.2019 00:00	POS533_UW_112															
14.03.2019 03:00	POS533_UW_113					1	1									
14.03.2019 06:00	POS533_UW_114	1	1			1	1							1		1
14.03.2019 09:00	POS533_UW_115		1				1									
15.03.2019 12:30	POS533_UW_116	1	1			1	1									
15.03.2019 15:00	POS533_UW_117	1	1			1	1							1		1
15.03.2019 18:00	POS533_UW_118	1	1			1	1									
15.03.2019 21:00	POS533_UW_119		1				1									
16.03.2019 00:00	POS533_UW_120	1	1			1	1							1		1
16.03.2019 03:00	POS533_UW_121	1	1			1	1							1		1
16.03.2019 06:00	POS533_UW_122	1												1		1
16.03.2019 09:00	POS533_UW_123															
16.03.2019 12:00	POS533_UW_124	1	1			1	1							1		1
16.03.2019 15:00	POS533_UW_125	1	1			1	1							1		1
16.03.2019 18:00	POS533_UW_126	1	1			1	1							1		1
16.03.2019 21:00	POS533_UW_127	1	1			1	1	1						1		1
17.03.2019 00:00	POS533_UW_128	1	1			1	1							1		1
17.03.2019 03:00	POS533_UW_129		1			1	1							1		1
17.03.2019 06:00	POS533_UW_130	1	1			1	1							1		1
17.03.2019 09:00	POS533_UW_131		1			1	1	1						1		1
17.03.2019 12:00	POS533_UW_132	1	1			1	1							1		1
17.03.2019 15:00	POS533_UW_133		1			1	1							1		1
17.03.2019 18:00	POS533_UW_134															
17.03.2019 21:00	POS533_UW_135		1				1	1								
18.03.2019 00:00	POS533_UW_136	1	1			1										
18.03.2019 03:00	POS533_UW_137	1	1				1									
18.03.2019 06:00	POS533_UW_138	1	1			1	1									
18.03.2019 09:00	POS533_UW_139	1	1			1	1									

Underway sampling POS533		DMS	Halo	N_2O	CH_4	Nuts	DOC	POC	FlowCyt	RNA	DBP'S	Oxygen	DIC	Pigment	Cocco	Pico-Pl
discrete		300	500	200	800	100	500	3000	10	2000	700	0.2	3	4500	4500	20
Date/Time UTC	Number	Dennis	HelMe	DeHelMe	DeHelMe	Corinne	Helmke	Helmke	Corinne	Corinne	Birgit	MaMe	MaMe	TeMa	TeMa	TeMa
18.03.2019 12:00	POS533_UW_140	1	1			1	1									
18.03.2019 15:00	POS533_UW_141	1	1			1	1									
18.03.2019 18:00	POS533_UW_142															
18.03.2019 21:00	POS533_UW_143															
19.03.2019 00:00	POS533_UW_144	1	1			1										
19.03.2019 03:00	POS533_UW_145															
19.03.2019 06:00	POS533_UW_146	1														
19.03.2019 09:00	POS533_UW_147															
19.03.2019 13:00	POS533_UW_148		3													

7.4 Air Canister Sample List

Air Canisters

		LocaL time	Date (UTC)	Sample Time (UTC)				Other Observations
Running No.	Canister-No.	LT (Start)	Date (2015)	Start	Stop	Can-pressure	Sampler	Comments on weather
1	700	18:20	28.02.2019	19:20	19:26	2.4	BQ	pump was running for 4 hours before
2	986	22:25	28.02.2019	23:25	23:30	2.4	BQ	
3	904	01:10	01.03.2019	02:15	01:20	2.4	BQ	
4	655	08:00	01.03.2019	08:05	08:08	2.4	BQ	
5	756	11:02	01.03.2019	12:08	12:11	2.4	BQ	
6	802	11:14	01.03.2019	12:14	12:17	2.4	BQ	
7	927	17:00	01.03.2019	18:14	18:17	2.4	BQ	
8	567	19:50	01.03.2020	20:50	20:53	2.4	BQ	FOGO_100 Windstill im Lee von Fogo
9	616	19:50	01.03.2021	20:58	21:00	2.4	BQ	FOGO_100 Windstill im Lee von Fogo
10	649	23:51	02.03.2022	00:54	00:58	2.4	BQ	FOGO_500
11	613	23:51	02.03.2019	01:00	01:05	2.4	BQ	FOGO_500
12	855	08:50	02.03.2019	08:58	09:03	2.4	BQ	Station_FOGO_3200
13	935	08:50	02.03.2019	09:06	09:11	2.4	BQ	
14	614	18:35	02.03.2022	19:40	19:45	2.4	C+J	
15	781	21:37	02.03.2019	22:43	22:48	2.4	C+J	
16	921	22:21	02.03.2019	23:32	23:35	2.4	C+J	cloud free
17	725	01:23	03.03.2019	02:48	02:53	2.4	C	cloud free
18	581	02:48	03.03.2019	03:50	03:55	2.4	C+J	cloud free
19	712	05:30	03.03.2019	06:46	06:51	2.4	C	cloud free, low wind
20	545	06:27	03.03.2019	07:31	07:36	2.4	C	d free, low wind, dust in air, beautiful sun
21	811	09:20	03.03.2019	10:30	10:34	2.4	BQ	
22	595	09:20	03.03.2019	10:28	10:30	2.4	BQ	
23	849	10:30	03.03.2019	11:35	11:38	2.4	BQ	filled only four times, ship was turning
24	719	10:30	03.03.2019	11:39	11:42	2.4	BQ	
25	975	13:30	03.03.2019	14:38	14:40	2.4	BQ	
26	815	13:30	03.03.2019	14:42	14:45	2.4	BQ	
27	755	14:30	03.03.2019	15:32	15:35	2.4	BQ	
28	547	14:30	03.03.2019	15:38	15:42	2.4	BQ	
29	695	17:00	03.03.2019	18:03	18:07	2.4	BQ	
30	532	17:00	03.03.2019	18:08	18:12	2.4	BQ	Flugzeug im Anflug auf Praia
31	844	20:15	03.03.2019	21:22	21:25	2.4	BQ	
32	902	20:15	03.03.2019	21:25	21:28	2.4	BQ	
33	568	23:05	03.03.2019	23:10	23:13	2.4	BQ	Maio_W
34	666	23:05	03.03.2019	23:15	23:18	2.4	BQ	Maio_W
35	765	07:10	04.03.2019	08:13	08:17	2.4	BQ	
36	794	07:10	04.03.2019	08:25	08:30	2.4	BQ	
37	569	10:05	04.03.2019	11:10	11:15	2.4	BQ	
38	554	10:05	04.03.2019	11:20	11:25	2.4	BQ	
39	784	15:25	04.03.2019	16:28	16:33	2.4	BQ	
40	732	15:25	04.03.2019	16:35	16:37	2.4	BQ	
41	717	17:45	04.03.2019	17:45	17:50	2.4	BQ	
42	800	17:50	04.03.2019	17:50	17:55	2.4	BQ	
43	821	20:20	04.03.2019	21:28	21:31	2.4	BQ	
44	634	23:00	05.03.2019	00:08	00:13	2.4	BQ	

Air Canisters

		LocaL time	Date (UTC)	Sample Time (UTC)				Other Observations
Running No.	Canister-No.	LT (Start)	Date (2015)	Start	Stop	Can-pressure	Sampler	Comments on weather
45	806	02:18	05.03.2019	03:18	03:28	2.4	BQ	CVAO
46	585	06:30	05.03.2019	07:35	07:40	2.4	BQ	CVAO
47	698	08:40	05.03.2019	09:45	09:47	2.4	BQ	
48	734	08:55	05.03.2019	10:00	10:05	2.4	BQ	
49	813	12:45	05.03.2019	13:51	13:50	2.4	BQ	
50	650	12:20	05.03.2019	13:39	13:47	2.4	BQ	
51	778	20:10	05.03.2019	21:10	21:14	2.4	BQ	
52	998	20:10	05.03.2019	21:18	21:23	2.4	BQ	
53	638	23:10	06.03.2019	00:05	00:10	2.4	BQ	
54	757	03:00	06.03.2019	03:00	03:05	2.4	BQ	
55	723	05:00	06.03.2019	06:00	06:05	2.4	BQ	
56	539	08:05	06.03.2019	09:10	09:15	2.4	BQ	
57	900	11:00	06.03.2019	12:00	12:05	2.4	BQ	
58	582	12:55	06.03.2019	14:00	14:04	2.4	BQ	
59	621	14:03	06.03.2019	15:02	15:07	2.4	BQ	
60	752	17:00	06.03.2019	18:10	18:15	2.4	BQ	
61	745	19:55	06.03.2019	21:00	21:05	2.4	BQ	
62	663	23:55	07.03.2019	00:03	00:08	2.4	BQ	
63	912	02:55	07.03.2019	03:05	03:10	2.4	BQ	
64	962	04:55	07.03.2019	06:00	06:05	2.4	BQ	
65	602	07:55	07.03.2019	09:05	09:10	2.4	BQ	
66	618	23:00	07.03.2019	12:11	12:15	2.4	BQ	
67	941	13:55	07.03.2019	15:00	15:15	2.4	BQ	
68	604	16:55	07.03.2019	18:00	18:05	2.4	BQ	
69	953	20:10	07.03.2019	21:18	21:23	2.4	BQ	
70	672	22:58	08.03.2019	00:05	00:10	2.4	BQ	
71	839	02:55	08.03.2019	03:00	03:05	2.4	BQ	
72	587	05:55	08.03.2019	06:00	06:05	2.4	BQ	
73	947	08:55	08.03.2019	09:00	09:05	2.4	BQ	
74	967	11:59	08.03.2019	12:05	12:10	2.4	BQ	
75	981	14:59	08.03.2019	15:05	15:10	2.4	BQ	
76	997	17:55	08.03.2019	18:01	18:06	2.4	BQ	
77	728	20:55	08.03.2019	21:00	21:05	2.4	BQ	
78	974	23:57	09.03.2019	00:02	00:07	2.4	BQ	
79	702	02:55	09.03.2019	03:00	03:05	2.4	BQ	
80	934	05:55	09.03.2019	06:00	06:05	2.4	BQ	
81	580	09:15	09.03.2019	09:20	09:25	2.4	BQ	
82	775	11:53	09.03.2019	12:00	12:05	2.4	BQ	
83	929	15:00	09.03.2019	15:05	15:10	2.4	BQ	
84	564	18:00	09.03.2019	18:05	18:10	2.4	BQ	
85	970	20:55	09.03.2019	21:00	21:05	2.4	BQ	
86	736	00:00	10.03.2019	00:05	00:10	2.4	BQ	
87	609	03:00	10.03.2019	03:05	03:10	2.4	BQ	
88	771	05:55	10.03.2019	06:00	06:05	2.4	BQ	

Air Canisters

		LocaL time	Date (UTC)	Sample Time (UTC)				Other Observations
Running No.	Canister-No.	LT (Start)	Date (2015)	Start	Stop	Can-pressure	Sampler	Comments on weather
89	603	08:57	10.03.2019	09:03	09:08	2.4	BQ	
90	976	12:02	10.03.2019	12:07	12:12	2.4	BQ	
91	677	14:55	10.03.2019	15:00	15:05	2.4	BQ	
92	946	18:05	10.03.2019	18:12	18:17	2.4	BQ	
93	856	21:00	10.03.2019	21:05	21:10	2.4	BQ	
94	740	00:17	11.03.2019	00:22	00:26	2.4	BQ	
95	648	03:00	11.03.2019	03:05	03:10	2.4	BQ	
96	739	05:35	11.03.2019	05:42	05:46	2.4	BQ	
97	819	09:10	11.03.2019	09:15	09:20	2.4	BQ	
98	754	12:15	11.03.2019	12:20	12:25	2.4	BQ	
99	646	14:15	11.03.2019	14:20	14:25	2.4	BQ	
100	543	04:48	11.03.2019	15:25	15:30	2.4	BQ	
101	983	02:24	11.03.2019	20:15	20:10	2.4	BQ	
102	767	00:05	12.03.2019	00:10	00:15	2.4	BQ	Gomera, townside , wake
103	747	02:05	12.03.2019	02:10	02:14	2.4	BQ	
104	738	03:10	12.03.2019	03:13	03:17	2.4	BQ	Gomera, townside , wake
105	769	04:23	12.03.2019	04:28	04:32	2.4	BQ	Gomera_W_100
106	915	06:08	12.03.2019	06:13	06:17	2.4	BQ	Gomera_S, Fisher, twon
107	804	08:25	12.03.2019	08:32	08:37	2.4	BQ	Gomera E
108	993	12:07	12.03.2019	12:12	12:17	2.4	BQ	Gomera- Tenerife
109	776	15:00	12.03.2019	15:03	15:07	2.4	BQ	Tenerife NE
110	611	17:23	12.03.2019	17:27	17:30	2.4	BQ	
111	528	20:03	12.03.2019	20:08	20:12	2.4	BQ	
112	600	22:14	12.03.2019	22:18	22:22	2.4	BQ	Flughafen Tenerife
113	949	00:00	13.03.2019	00:03	00:08	2.4	BQ	Tenerife
114	743	01:42	13.03.2019	01:45	01:50	2.4	BQ	
115	544	04:08	13.03.2019	04:13	04:17	2.4	BQ	
116	952	07:13	13.03.2019	07:18	07:22	2.4	BQ	
117	910	09:35	13.03.2019	09:40	09:45	2.4	BQ	
118	913	14:58	13.03.2019	15:03	15:08	2.4	BQ	
119	526	18:15	13.03.2019	18:20	18:25	2.4	BQ	
120	799	20:59	13.03.2019	21:04	21:09	2.4	BQ	
121	850	23:50	13.03.2019	23:55	23:59	2.4	BQ	
122	925	03:00	14.03.2019	03:06	03:10	2.4	BQ	
123	917	05:55	14.03.2019	06:00	06:05	2.4	BQ	
124	589	08:05	14.03.2019	08:12	08:16	2.4	BQ	
125	772	11:05	14.03.2019	11:10	11:14	2.4	BQ	
126	835	09:30	15.03.2019	09:33	09:37	2.4	BQ	
127	550	09:37	15.03.2019	09:40	09:45	2.4	BQ	
128	809	12:30	15.03.2019	12:35	12:40	2.4	BQ	
129	751	15:05	15.03.2019	15:10	15:15	2.4	BQ	
130	718	18:05	15.03.2019	18:10	18:15	2.4	BQ	
131	914	21:27	15.03.2019	21:33	21:38	2.4	BQ	
132	977	23:55	16.03.2019	00:00	00:05	2.4	BQ	

Air Canisters

		LocaL time	Date (UTC)	Sample Time (UTC)				Other Observations
Running No.	Canister-No.	LT (Start)	Date (2015)	Start	Stop	Can-pressure	Sampler	Comments on weather
133	535	03:22	16.03.2019	03:26	03:30	2.4	BQ	
134	827	06:03	16.03.2019	06:08	06:13	2.4	BQ	
135	749	09:00	16.03.2019	09:05	09:10	2.4	BQ	
136	691	12:00	16.03.2019	12:05	02:24	2.4	BQ	
137	692	14:58	16.03.2019	15:02	15:07	2.4	Cl	
138	992	17:55	16.03.2019	18:00	18:05	2.4	R	
139	969	21:00	16.03.2019	21:00	21:05	2.4	Cld	
140	940	23:55	17.03.2019	00:00	00:05	2.4	Cld	
141	945	03:10	17.03.2019	03:14	03:19	2.4	BQ	
142	689	06:00	17.03.2019	06:05	02:24	2.4	BQ	
143	694	06:44	17.03.2019	09:00	09:05	2.4	F	
144	763	12:10	17.03.2019	12:15	12:20	2.4	BQ	
145	642	15:15	17.03.2019	15:20	15:25	2.4	BQ	
146	958	17:55	17.03.2019	18:00	18:05	2.4	F	
147	720	20:55	17.03.2019	21:00	21:05	2.4	Cl	
148	548	23:57	18.03.2019	00:02	00:07	2.4	C	
149	560	03:09	18.03.2019	03:14	03:19	2.4	BQ	
150	606	06:07	18.03.2019	06:11	06:15	2.4	BQ	
151	907	08:53	18.03.2019	08:58	09:07	2.4	R	
152	759	12:03	18.03.2019	12:08	12:14	2.4	BQ	
153	851	15:10	18.03.2019	15:15	15:20	2.4	BQ	
154	639	16:06	18.03.2019	16:10	16:15	2.4	BQ	avy rain-shower (the only during the cruis
155	549	17:00	18.03.2019	17:05	17:10	2.4	BQ	
156	911	18:03	18.03.2019	18:08	18:13	2.4	BQ	
157	971	18:55	18.03.2019	19:00	19:05	2.4	F	
158	675	20:03	18.03.2019	20:07	20:12	2.4	C	
159	780	20:56	18.03.2019	21:01	21:06	2.4	Cl	
160	854	22:05	18.03.2019	22:10	22:15	2.4	Cl	
161	658	23:00	18.03.2019	23:05	23:10	2.4	Cl	
162	577	00:00	19.03.2019	00:10	00:15	2.4	Cl	
163	657	01:10	19.03.2019	01:15	01:20	2.4	Cl	Cl
164	791	01:55	19.03.2019	02:00	02:05	2.4	Cl	
165	857	03:05	19.03.2019	03:10	03:15	2.4	BQ	
166	955	04:00	19.03.2019	04:05	04:10	2.4	BQ	
167	704	05:00	19.03.2019	05:03	05:08	2.4	BQ	
168	833	06:10	19.03.2019	06:15	06:20	2.4	BQ	
169	662	06:55	19.03.2019	07:00	07:05	2.4	F	
170	722	07:55	19.03.2019	08:00	08:05	2.4	F	
171	525	09:03	19.03.2019	09:08	09:13	2.4	F	
172	973	09:55	19.03.2019	10:00	10:05	2.4	R	
173	748	10:54	19.03.2019	10:58	11:02	2.4	R	
174	906	12:03	19.03.2019	12:08	12:13	2.4	BQ	wind from back as ship was turning
175	795	12:32	19.03.2019	12:35	12:40	2.4	BQ	approaching Funchal harbour
176	956	12:32	19.03.2019	12:40	12:45	2.4	BQ	approaching Funchal harbour

Air Canisters

		LocaL time	Date (UTC)	Sample Time (UTC)				Other Observations
Running No.	Canister-No.	LT (Start)	Date (2015)	Start	Stop	Can-pressure	Sampler	Comments on weather
177	536	12:32	19.03.2019	12:47	12:52	2.4	BQ	approaching Funchal harbour
178	726	12:32	19.03.2019	12:56	13:03	2.4	BQ	approaching Funchal harbour
179	779	12:32	19.03.2019	13:02	13:07	2.4	BQ	approaching Funchal harbour
180	820	12:32	19.03.2019	13:08	13:13	2.4	BQ	Funchal harbour

7.5 Summary of measurements and samples taken

PI	Sample number	Units	Measured parameters and methods
Quack	400	CTD-sample	Mass-spectrometry of brominated and iodinated hydrocarbons
Quack	400	CTD- sample	Mass-spectrometry of chlorinated hydrocarbons
Quack	180	underway	Mass-spectrometry of brominated and iodinated hydrocarbons
Quack	180	underway	Mass-spectrometry of chlorinated hydrocarbons
Quack	71	CTD	T,S. Oxygen, Flouorescence
Booge	400	CTD- sample	Mass-spectrometry of DMS and Isoprene
Booge	180	underway	Mass-spectrometry of DMS and Isoprene
Booge	400	CTD- sample	Methane and Nitrous oxide
Booge	180	underway	Methane and Nitrous oxide
Caldeira	2800	miles	120 Khz- currents of the upper 120 m
Salgado	52	balloons	Radiosounding of marine atmospheric boundary layer
Salgado	2800	miles	Par, total and longwave radiation
Caldeira	16	deploy	Microstructure profiling of upper water column
Davila	2800	miles	continuous measurements of pH
Davila	280	samples	Surface-alkalinity and total dissolved inorganic carbon
Davila	430	samples	Oxygen
Davila	430	samples	Alkalinity and total dissolved inorganic carbon of deep water
Santana-Casiano	25	samples	Samples taken from 20 m depth for the speciation of iron. Oxidation kinetics of Fe(II). Complexing capacity for Fe and Cu
Kaufmann	280	samples	Phytoplankton-pigments will be later analyzed in laboratory
Kaufmann	180	underway	Phytoplankton-pigments will be later analyzed in laboratory
Kaufmann	280	samples	Coccolithophorides and picoplankton
Kaufmann	180	underway	Coccolithophorides and picoplankton
Atlas	180	samples	Air samples for analysis of 50 trace gases in marine boundary layer
Boudenne	100	samples	Samples for disinfection byproducts (HAA's, Halo -Phenols)
Löscher	200	samples	DNA/ RNA filter samples of sea water
Engel	280	samples	POC/PON filter samples
Engel	290	samples	DOC samples
Engel	290	samples	CDOM/fDOM samples
Greinert	2800	miles	CO_2, CH_4 and water vapour measurements of marine atmosphere
Quack	2800	miles	SST, Surface salintiy of thermosalinograph
Caldeira	2800	miles	SST, Surface salintiy of microcat in hydrographic shaft
Quack	2800ngel	miles	Meteorological data from the ships sensors
Quack	2800	Miles	Gas tension and continuous oxygen measurements
Quack	67	CTD	PAR of surface water from CTD- when it was deployed shallower than 2000 m

8 Data and Sample Storage and Availability

Experienced data managers at GEOMAR support all researchers in order to achieve an overall state of FAIR research data. The Ocean Science Information System (OSIS) at GEOMAR is used to preserve a complete record of data and metadata related to the project. This central information system as a hub for data and information exchange persists for all AIMAC- participants to up-and download cruise related data and publications. According to the time schedules in the DMP, research data will be published in. PANGAEA, with persistent identifiers (DOI) to ensure open access to the research data and their FAIR compliance being findable, accessible, interoperable and reusable.

Table 8.1 Overview of data availability

No	**Type**	**Instrument/ Method**	**Parameter**	**Contact**	**Datab ase**	**Date of Data-availability**
1	Halocarbons	GC/MS	Methyliodide,Dichloromethane,Trichloromethane,Tetrachlorormethane,Dibromomethane (C12/C13),Chloroiodomethane, Dibromochloromethane,Bromoiodomethane,Bromoform (C12/C13),diiodomethane	Quack	OSIS/ AIMAC	January 2020
2	Nitrous Oxide	GC/ECD	N_2O discrete/underway/CTD	Bange	OSIS/ AIMAC	April 2020
3	Methane	GC/FID	CH_4 discrete/underway/CTD	Bange	OSIS/ AIMAC	February 2020
4	Oceanography	ADCP_ 120kHz	Currents	Caldeira	OSIS/ AIMAC	2020
5		Thermosalinograph	Salinity, temperature, fluorescence	Caldeira	OSIS/ AIMAC	May 2019
6		CTD	Salinity, Temperature, Depth	Quack	OSIS/ AIMAC	May 2019
6.1		CTD	PAR- Sensor	Quack	OSIS/ AIMAC	October 2019
7	Oceansensors	Sensor-Box	O_2/gas tension/fluorometer	Quack	OSIS/ AIMAC	2020
8		PO_2 (Oxygen)	Oxygen in seawater	Quack	OSIS/ AIMAC	2020
9		T	SST from Optode	Quack	OSIS/ AIMAC	2020
10		Gas tension device	Total gas pressure in water	Quack	OSIS/ AIMAC	2020
11	CO_2- System	Pro-oceanus	pCO_2	Davila	OSIS/ AIMAC	November 2019
12		Photometric titration	pH	Davila/	OSIS/ AIMAC	November 2019
13		VINDTA system	total alkalinity	Davila/	OSIS/ AIMAC	November 2019
14		VINDTA system	total dissolved inorganic carbon	Davila/	OSIS/ AIMAC	November 2019
15	Oxygen	Winkler Titration	Oxygen	Davila	OSIS/ AIMAC	November 2019
16	Iron	Teflon pump	Iron	Santana	OSIS/ AIMAC	November 2019
17	Biology	Cell counter/ flow	Bacterial Abundances	Löscher	OSIS/ AIMAC	2020

		Cytomtrie				
18		flow cytometry	Picoplankton	Kaufmann	OSIS/ AIMAC	2020
19		HPLC	Pigments	Kaufmann	OSIS/ AIMAC	2020
20		polarized light microscopy (+SEM)	Coccolithophores	Kaufmann	OSIS/ AIMAC	2020
21		light microscopy	Microphytoplankton	Kaufmann	OSIS/ AIMAC	2020
22		Sequencing	RNA	Löscher	OSIS/ AIMAC	2020
23	Biogeochemistry	Auto-analyzer (Seal Quattro)	µmolar-nutrients	Quack	OSIS/ AIMAC	November 2019
24		TOC-Analyzer	DOC (dissolved organic carbon)	Engel	OSIS/ AIMAC	February 2020
25			DON (dissolved organic nitrogen)		OSIS/ AIMAC	February 2020
26		CHN-Analyzer	POC	Engel	OSIS/ AIMAC	December 2019
27			PON		OSIS/ AIMAC	December 2019
28			PIC (particulate inorganic carbon)	Engel	OSIS/ AIMAC	December 2019
29		UV-Vis-spectrophotometer, 3D-EEM fluorescence spectroscopy	CDOM/FDOM	Engel	OSIS/ AIMAC	February 2020
30	Trace gases	GC/MS	DMS/Isoprene	Booge	OSIS/ AIMAC	January 2020
31	Atm. profiling	Radiosondes	T, Td, w, stability	Salgado /Faria	OSIS/ AIMAC	October 2019
32	Radiation	Sensors from Portugal	Long- and shortwave, PAR	Salgado	OSIS/ AIMAC	2020
33	Air sampling	Canisters	50 long- and short lived trace gases	Atlas	OSIS/ AIMAC	2019
34	Trace gas profiles	Picarro	CO_2, CH_4, Water vapour in three heights	Greinert	OSIS/ AIMAC	2020
35	Meteorologie, SST and salinity	DSHIP	Wind dir, wind-speed T, P, hum, Sal, SST, fluoresecence	Quack	OSIS/ AIMAC	April 2019
36	Disinfection byproducts	MS	HAA's, Halo-phenols	Boudenne	OSIS/ AIMAC	2020

9 Acknowledgements

The crew has always responded courteously to our requests and done their best to support our shared travel success. Planning, changes and information were exchanged in a friendly and timely manner. The loss of a Portuguese microstructure probe and two water-sampling bottles, as well as the necessary repair of the winch hydraulic system was due to unfortunate circumstances that do not diminish the scientific success of the trip. Many thanks to Captain Günther and his crew, as well as to Klas Lackschewitz for the diplomatic clearances. Many thanks to Rene Witt and Rui Salgado for helping with the set up and especially Rui Caldeira for also helping but as owner of the microstructure probe for his generous understanding that the loss was due to a conglomerate of unfortunate occurences. We thank Frank Malin and Kastriot Quelay for the nutrient analysies. Also thanks to the University of Madeira, who helped to import the Portuguese scientific equipment, after unforeseen custom issues arose. Also thanks to the technical staff of the Ocean Science Center Mindelo, who did a very good job in providing the necessary liquid nitrogen in time for the cruise.

10 References

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